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# Journal of Agriculture

AND

# Industry

No. 1. REGISTERED AS

AUGUST, 1897.

A NEWSPAPER VOL. I.

## INTRODUCTORY.

It is usual in all new publications to give some reason for coming before the public in print. In this case the *Journal of Agriculture and Industry* has no apology to offer, since it really is an old friend in a new dress. The fact is that the Department of Agriculture has so increased in importance that it has been deemed to be necessary to establish some ready means of inter-communication with the producers and industrialists generally; and, as the Agricultural Bureau was already publishing a monthly journal of its proceedings, advantage has been taken of that fact to enlarge the scope of its usefulness by extending its borders so as to embrace the whole of the divisions under the control of the Ministers of Agriculture and Industry. It is the intention, therefore, to issue a monthly journal under the title above given, and to endeavor to make it both useful and instructive to all classes of industrialists. It has been arranged to publish the *Journal* in such form that it will be possible to exchange blocks and illustrations of articles upon practical subjects with similar publications issued by the Departments of Agriculture of New Zealand, Queensland, and New South Wales. Specialists in the various branches of science and industry in the various Australasian colonies have already been interviewed and communicated with, and have promised their active sympathy and assistance in making this publication as valuable as possible to all classes; and it is requested and hoped that every true colonist will assist in the useful work by communicating any and every item of practical information which may tend to forward the progress of this or any of the Australasian colonies.

The Editor does not undertake to publish everything that may be forwarded to him, but he will feel deeply grateful to all correspondents who communicate items of useful knowledge, and will endeavor to collate and bring together from all sources such a variety as shall make the *Journal of Agriculture and Industry* next to indispensable in the home of everyone connected with our industrial pursuits.

Subscriptions, including postage, 5s. per annum in advance. Copies will be posted free to members of the Agricultural Bureau.

All communications should be addressed to "Editor, *Journal of Agriculture and Industry*, Agricultural Bureau, Adelaide."

## NOTES AND COMMENTS.

The weather has been very favorable for all agronomical operations during the past two months. Reservoirs and water dams have been filled, the soil has received a good soaking in all settled parts, and grass and herbage have made fair growth. The advent of fine and warmer weather during next month will cause rapid growth to take place, and the animals that have survived the drought may be expected to regain strength and good condition. Efforts should be made to conserve some small areas of natural herbage in order that the plants may produce seeds; because in many localities the grasses have been eaten down so closely that natural regeneration has been prevented, and many of the most valued plants have been exterminated.

The shipment of 1,103 cases of South Australian oranges through the Produce Export Branch of the Agricultural Department, per s.s. *Australia*, on July 14th, is the first, it is to be hoped, of a regular export of this and similar fruits to the European markets. The average of oranges grown in this colony is generally of very fair quality, and, therefore, our growers should stand in a good position with regard to prices, as well as in respect to geographical position, placing them several days nearer to their market. Last season the New South Wales Department of Agriculture purchased a number of cases of oranges, which had to be largely culled and repacked. Upon a shipment of 1,000 cases thus treated a profit of about £140 was made, and another shipment was to be forwarded this season as a second trial.

The Central Bureau introduces only such kinds of seeds that are not generally sold in our own seed shops. These seeds are only of such kinds that are considered to be of economic value, and suitable for cultivation in this climate. In some cases they are new cross-fertilised varieties, and naturally some of the plants raised from them do not "come true" to their parentage. Only very small packages are sent out to be tried by our members, and these are not likely to be repeated; therefore it is important that each recipient should save seeds for further trials and experiments. Unfavorable seasons, unsuitable soils, conditions, and modes of treatment often cause unsatisfactory results, and due allowance ought to be made in these respects.

A recent issue of the *Mark Lane Express* gives some interesting particulars concerning the prices of commercial fertilisers when supplied in fairly large quantities. Thus:—

	Per Ton.		
	£	s.	d.
Nitrate of soda, guaranteed 95 per cent. pure, in bags .....	8	0	0
Sulphate of ammonia, guaranteed 24 per cent., in bags .....	8	5	0
Kainit, guaranteed 23 per cent. sulphate of potash, in bags .....	2	7	6
Basic slag, guaranteed 30 to 35 per cent. phosphate of lime, in bags ....	1	12	0
Basic slag, guaranteed 38 to 45 per cent. phosphate of lime, in bags ....	1	13	6
Superphosphate of lime, 25 to 27 per cent. soluble phosphate, in bags ...	1	18	3
Superphosphate of lime, 30 to 31 per cent. soluble phosphate, in bags ...	2	3	3
Superphosphate of lime, 35 to 36 per cent. soluble phosphate, in bags ....	2	9	6
East Indian bone meal, in bags .....	4	5	0

The freight per ton to Australia, with other charges, will certainly not exceed 25s. per ton.

Breeders of horses, cattle, sheep, pigs, poultry, and other domesticated animals have long since discovered that they must continually select the best types of various breeds for propagation if they will keep up to the highest standard of perfection. Gardeners have to be very careful to select the best types of their various products to bear seed for future sowings, or otherwise the results will be disastrous. The average farmer goes on sowing seed taken haphazard from his own or his neighbors' crops, without any attempt to select and propagate an improvement upon his latest crops. The result is that his seed deteriorates, and is neither so large nor so prolific as it might have been if he had selected some of the largest and most prolific plants and propagated their seed in a specially-reserved plot. Sorghum, for instance, will deteriorate very rapidly; but if the largest, best-shaped, and most prolific heads are selected and propagated in a separate field for seed purposes, the result may be four to six fold as compared with crops raised from seed taken haphazard from the ordinary field crops. "Like produces like," and if only the best plants of any kind are selected and re-selected a few times there will be a very great improvement. There would be no necessity for introducing new varieties of cereals if our farmers would only improve those they have already, and this can quickly and easily be brought about by the method above indicated.

Nomenclature of fruits is one of the difficulties encountered by fruitgrowers throughout the whole of the colonies, and should be dealt with as early as possible. At three Intercolonial Conferences of Fruitgrowers the question has been discussed, and committees of skilled growers to inspect and name the exhibits of apples and pears have been appointed with no beneficial result. What is needed is a collection of correct models for each colony, then let the committee decide the correct nomenclature. The Angaston Branch of the Agricultural Bureau is desirous that this subject shall be discussed at the Ninth Congress of the Bureau, to be held on September 8th, 9th, and 10th, in Adelaide.

Some remarkable results have been brought out at the Hawkesbury Experimental Farm, Richmond, New South Wales, with regard to lucern. The question has been submitted as to whether there are two varieties of lucern, since a field sown with seed imported from Europe will consist of plants of poor growth, with small leaves: whilst a field sown with acclimatised colonial-grown seed will be twice as high and dense, and the leaves of double the size. Plots sown side by side, under exactly the same conditions, came out as follows:—The first cut was taken on February 29th, 1896, and the second on May 1st, 1896, and gave the following results.—

		Tons cwt. qrs. lbs.				Tons cwt. qrs. lbs.			
1.	Seed from Tamworth, New South Wales	1	6	3	4	1	10	2	12
2.	" Singleton, "	0	12	2	0	0	14	1	16
3.	" England .....	0	17	3	12	0	16	3	20
4.	" Hungary .....	0	19	2	16	0	9	3	4
5.	" United States of America ..	1	12	0	16	1	8	0	12

Last season was very dry, and the plants from colonial seed made still better growth—No. 1 up to 18in. high, No. 2 came next in luxuriance, followed by No. 5, then No. 3; but No. 4 was quite weak, and became badly diseased with leaf spot. It must be remarked that the colonial seed plots showed more gaps than were found in those sown with imported seed. [Possibly owing to imperfect fertilisation.] One thing in favor of the Tamworth plot was a bush house standing alongside, which may have sheltered the plants to some extent.

There is no doubt whatever that superphosphate gives immediate returns upon its application for a cereal crop; but it has until lately been considered that bonedust was altogether more profitable, as well as more lasting. Recent experiments, however, appear to show that the profit from using superphosphate is quite double that to be obtained from using bonedust. Farmers should try these fertilisers side by side.

## NOTES ON VEGETABLE-GROWING FOR AUGUST.

BY GEORGE QUINN.

During the month preparations must be made for the summer vegetables. In frames built upon and banked around with fresh manure sow—in boxes, pots, or upon a depth of not less than 4in. of free loamy soil spread upon the manure inside the frame—seeds of tomatoes. In similar frames in 4in. pots sow cucumbers and melons. Pots are necessary so that the plants can be put out without being disturbed later on. Any tomatoes previously sown can be pricked off into small pots or boxes with a similar object in view, but should be still sheltered. Sow upon soils that can be irrigated, or in positions suited to retaining the moisture, peas (only early sorts), red and silver beet, Swede turnips, lettuces, radishes, mustard and cress, prickly spinach, New Zealand spinach, and chance crops of parsnips and carrots. Upon warm soils, or in warm sheltered positions, sow dwarf beans, but do not soak the seeds in hot water—allow them plenty of time to germinate. It will be useless to sow these where frosts are yet prevalent. Plant out onions, cabbages, celery, Chinese and globe artichokes, and potatoes. In planting the latter always put in either small complete tubers or fairly plump sets, as it seems the quantity of pulp for the young plant to draw from will often mean the difference between a healthy vigorous start, able to resist disease or climatic changes, and a sickly unproductive plant. Prepare ground for putting out bulk crops of cucumbers, melons (pie, sweet, and water), marrows, gourds, pumpkins, trombones, and tomatoes.

Keep the ground between the rows of vegetables well hoed as often as time and fine weather permit, but do not stamp about on the surface of the ground when it is very wet if it can possibly be avoided. Dressings of quickly dissolving manures, such as sulphate of ammonia or superphosphate, sown along the rows of growing plants and hoed in will act as a good stimulant.

In the wetter mountainous country, where water is plentiful in summer and the soil free, dressings of manure can be applied to asparagus and rhubarb beds. In late localities asparagus may yet be planted.

Beds of cabbages, potatoes, cauliflowers, peas, and beans should be constantly hoed, and earthing up should be done to these crops.

Make fresh sowings of peas, beets, carrots, parsnips, broad beans, turnips, celery, spinach, onions, leeks, &c. Thin out former sowings of root crops. Transplant cabbages, onions, cauliflowers, lettuces, celery; plant out potatoes, shallots, and garlic. These last-named should have been put out earlier than this date. In frames placed in warm sheltered positions make sowings of melons, cucumbers, tomatoes, chillies, and capsicums, as advised for plains. Old clumps of herbs may be taken up, divided, and replanted, discarding the old hardwooded parts

## SNAILS AND SLUGS.

A garden in Brisbane was invaded by slugs; but the owner surrounded each small plant with a ring of tobacco dust obtained from a factory, with the result that dead slugs could be gathered by bucketsful. Gardeners should grow some tobacco for this purpose as well as to serve as a general insecticide.

## DAIRY.

At the Mount Barker Agricultural Show, held on March 11, 1897, the dairy stud Jersey bull "Nelson," owned by Mr. J. F. Cudmore, was awarded the prize of £10 10s., one-third of which was provided from the funds of the society and two-thirds by the Department of Agriculture. The conditions upon which the State prize was offered were that the animal shall be kept for hire within five miles of the show ground, and Mr. Cudmore has executed an undertaking to keep the bull for use within the prescribed area for one year at 7s. 6d. per cow.

The following prizes were awarded last year :—

Society.	Breed	Station.	s.	d.
Stanley.....	Ayrshire..	Mr. J. B. Tothill's, Auburn .....	7	6
Petersburg ..	Ayrshire..	Mr. J. Wilson's, jun., hundred of Gumbowie..	5	0
Southern .....	Ayrshire..	Mr. Basham's Middleton .....	5	0
Strathalbyn..	Ayrshire..	Hon. J. L. Stirling's, M.L.C .....	7	6

A new invention for separation of milk from its cream, and manufacture of butter at the same time (if desired), has been placed before dairymen by Eric A. Wablin. The machine can be used simply as a separator or for separating and churning together. By turning a thumbscrew it is possible also to add coloring and salt. All operations can be carried on continuously and automatically when once started.

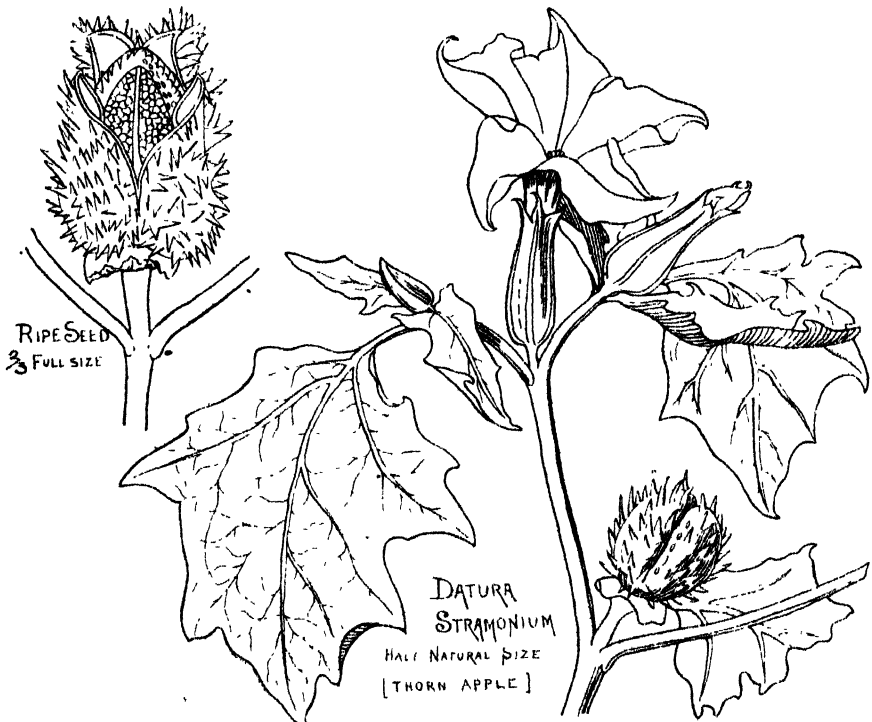
Mr. A. J. Murray, of Mount Crawford, writing to the Hon. Secretary of our Port Broughton Branch, regretting that he had no Jersey bulls for sale, remarked that the value of pure bulls of good dairy breeding cannot be too highly estimated for improvement of the dairy herds of the colony. He had tried most of the breeds, including Devons, Ayrshires, and Durhams, and once owned the champion cow Duchess and the prize-winner Countess, of the famous "Ned Bagot" strain, but found his part of the country too cold, and the feed not rank enough for them. He then tried Jerseys, and found the butter yield (under the same conditions) increase far beyond his expectations. Whilst Jerseys thrive on less rank feed, they will yet give a larger yield of butter when fed generously, probably to a greater extent than any other breed. If obtained from herds having good constitutions the Jerseys are extremely hardy, and withstand both heat and cold. They are particularly well adapted for dairy farms, because the treatment of the calves in order to produce good milkers is the most economic. For the first two or three weeks the calves should be well fed, but after that give them only skim milk, and keep them just in good health. They should *always* be brought into profit at *two years* old. This is to prevent the heifers developing a tendency to produce fat. The tendency to convert their food into milk rich in butter-fat is increased to a maximum. The cows should always be brought into good condition before calving, as no amount of feed will fatten a Jersey when in milk if she is a rich butter cow. They use the bulls as yearlings in Jersey.

*The Dairy*, May 15, 1897, page 124-5, says :—" Mr. J. F. Hall, a landowner in Somersetshire, in evidence before the Royal Commission on Agriculture, showed that, from careful records, he found Jerseys more profitable than Shorthorns. Three Jerseys ate the same amount as two Shorthorns, and he made £15 a year more from every three Jerseys than he did from every two Shorthorns.

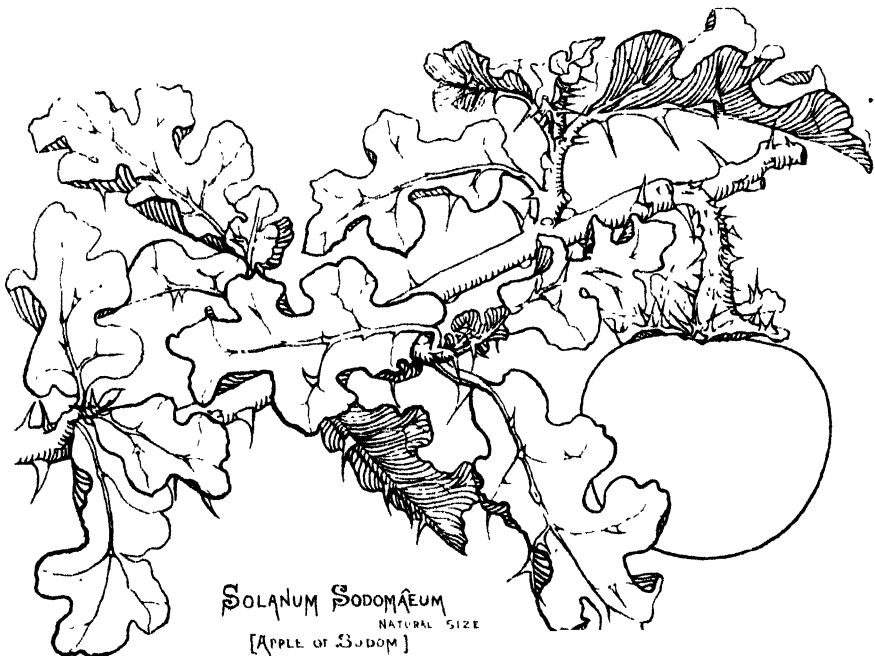
## NOXIOUS WEEDS.

In order that all persons interested may be able to identify the weeds that have been declared to be noxious within the meaning of the Act, it has been deemed necessary to print illustrations of some of them from time to time, and in this issue of the *Journal of Agriculture and Industry* are printed drawings of the three weeds recently added to the list—

**DATURA STRAMONIUM** is commonly called "Thorn Apple," "Mad Apple," "Devil's Trumpet," "Devil's Apple," "Stramonium," and by some other names. It is very poisonous both in foliage and seeds, and has caused the deaths of dairy and quiet cattle in many cases. Bush cattle very seldom nibble such plants. In common with several other poisonous plants, *Datura* is used in medical practice with beneficial effect, but is extremely dangerous when administered without an exact knowledge of its poisonous nature. The flowers are white, with a very slight greenish tinge on the lower portion of the tube. The plant is of a succulent nature, with green woody stem, many branches; leaves have stalks, are dull green, paler beneath, with undulating margin, deeply and irregularly indented, forming irregular teeth. The fruit or seed pod is egg-shaped, about 2in long, and covered with stout spines. The illustration is true to nature



**SOLANUM SODOMÆUM.**—This is called “Apple of Sodom,” is a perennial shrub, growing from 2ft. to 3ft. high, with strong spines both on leaves and stems; the leaves are sinuate or waved on edges, rather crinkled, and bright green; flowers are violet, with bright yellow stamens—like the flower of a potato: the berries or fruits are bright lemon yellow, and hang on the plant until they shrivel and change to a dirty parchment color. The seeds are very numerous. The illustration is natural size. This plant is generally reputed to be poisonous, and is undoubtedly objectionable on account of its thorny nature and of its taking possession of the land when once it has gained a footing,



**ASPHODELUS FISTULOSUS.**—The name commonly given to this plant is “Wild Onion,” because the leaves, especially of the young plant, resemble those of a clump of eschallots in every way. The plant takes entire possession of the land wherever it obtains a footing, and no animal is known to eat it. At the base of the leaves, near the roots, they are enveloped with a silvery-white membranous substance. The flowers are white, five-petalled, with a faint reddish flush over the petals, and down the centre is a pinkish carmine stripe. Seed pods are globular, generally very numerous, and provided with many seeds. The roots are thick and fleshy, of a dirty yellowish color, and the plants keep green all the year through.



*ASPHODELUS FISTULOSUS*. [WILD ONION]  
HALF NATURAL SIZE.

- A. LEAVES.
- B. FLOWERS.
- C. SEED STEM.
- D. YOUNG PLANT



## THE BEEHIVE.

BY *APIS LIGUSTICA*.

### Introductory.

Although the keeping of bees has been followed from ancient times until the present day, it is only during the last forty years that this industry has become a certain and profitable pursuit. Whilst bees were kept in simple boxes, so little was known about their habits, and therefore so uncertain were the results obtained from their labors, that it was not considered a lucrative business to invest in, or at any rate to make the sole occupation for a living. But with the invention of the movable comb hive all this was changed, and an impetus was given to beekeeping that quickly caused it to be looked upon as of some considerable importance. The movable comb hive was invented by the Rev. L. L. Langstroth, of America, and Dr. Dzierzon, of Germany, almost simultaneously in the year 1850. The objection to Dzierzon's hive was that he used a top bar only, and allowed the bees to fasten their combs to the sides of the hive, which fastenings had to be cut each time a comb was removed. Baron von Berlepsch has since added a complete frame to this hive, and so improved it. Mr. Langstroth's invention was of so practicable a form that it was at once adopted, and is now largely used by beekeepers in England, America, and Australia. Experience has proved that for our climate the Langstroth hive with the frames arranged at right angles to the front or entrance is by far the most suitable, and therefore this system has been almost universally used in South Australia. At this time of year a colony of bees consists of a queen and workers, but later on drones will be added to these. The queen is the mother bee, as she alone, except in very rare cases, lays all the eggs from which the inhabitants of the hive are produced. Her fertility is remarkable, and she will often deposit 2,000 or 3,000 eggs daily. The workers do all the work of the hive, such as gathering honey, building combs, and feeding the brood. They are imperfect females, and occasionally, when a hive has lost its queen, they become so far fertile as to lay eggs, but these always produce drones. The drones are the males, and are produced at the approach of the swarming season for mating with the young queens and continuing the race. They gather no honey, and are usually driven from the hive at the end of the summer.

The following table, taken from Cowan's Guide Book, gives the periods of the different changes of bees from the eggs to the perfect insect:—

	Queen.	Worker.	Drone.
1. The hatching of the egg takes place and the grub emerges on the.....	4th day	4th day	4th day
2. The cell is sealed over on the.....	9th day	9th day	9th day
3. The bee leaves the cell as a perfect insect on the.....	16th day	22nd day	25th day
4. The bee leaves the hive to fly on the.....	5th day	14th day	14th day

Honey-comb is made of wax and consists of six-sided cells. Those in which worker bees are bred are the smallest made; these are twenty-five to a square inch on each side of the comb. Drone cells are larger, four cells measuring lin., or sixteen to a square inch. Both sizes of cells are used for storing honey. Wax is a secretion, and is produced in the body of the bee. If bees when building combs are examined, the little scales of wax will be seen on the underside of the insects' bodies. It is estimated that at least 15lbs. of honey are consumed to produce 1lb. of wax. The weight of comb required to fill an ordinary sized hive is about 2lbs., and taking into consideration the time lost

by the bees while building it which might otherwise have been employed in gathering honey, it would make each pound of wax equal to at least 20lbs. of honey. From this it will be seen what a saving there is in using over and over again the same combs, as we are enabled to do by the aid of the modern hive.

Pollen is the fertilising dust of flowers, gathered by the bees, moulded into the shape of a very small ball and carried on the hind legs of the bees to the hive, where it is used for the preparation of food for the nourishment of the young grubs. Propolis is a substance obtained from buds and limbs of trees. It is carried, like pollen, on the hind legs of the bees, and is used to stop up every crevice about the hive. Some varieties of bees, and especially the Italians, will smear with propolis all the woodwork inside the hive, and from its sticky nature this will cause considerable annoyance when handling the frames.

The movable comb hive was introduced and generally used in South Australia about ten years ago, when a great impetus was given to this industry. Several factories for the manufacture of hives and appliances were started in Adelaide, and apiaries sprang up in all directions. With good seasons and a high price for honey, both the manufacturers and the beekeepers made fine profits. Lately this has all been changed, the factories have all been closed, and the majority of the apiaries have vanished. The reason for this is not far to seek. In the first place, numbers of persons who rushed into beekeeping were so utterly unfitted for it that for them it was bound to be a failure. In the second place, and by far the most serious trouble, was the low price of honey. It is generally agreed that when honey is selling at 3d. per pound the beekeeper can just make a profit out of his bees, but when the price goes below that he must look to something else for a living. For some years the price of honey has been so low in South Australia that there has been no encouragement to apiarists. We think that in the near future there will be a much better market for honey, both liquid and in the comb, and that this improvement will be caused by the Government Export Depot. There is no doubt that beekeepers now have a splendid chance to dispose of these products through this agency, and when the export of honey increases, as it certainly will do, the price must improve. Of course it is of the utmost importance to send out of the colony only the very finest quality of honey, so that at the outset a favorable impression may be made. There is no use disguising the fact that the people in England are used to good honey, and while they will pay an excellent price for such, they will not look at that of an inferior quality. Any Australian beekeeper who has had an opportunity of tasting the justly celebrated Narbonne honey can readily form his own standard of excellence. We have and can produce honey equal to any in the world, and that is the quality that should be forwarded for export.

That this is a most suitable country for beekeeping has been proved by the excellent results obtained by many apiarists in various districts. We have a variety of indigenous trees that bloom in succession and yield large quantities of honey, and our dry climate seems to be peculiarly favorable to the honey bee. There is no extreme cold requiring the expense of special arrangements for protecting the inmates of the hives during the winter months, as in England and America. Yet, in spite of these advantages, it is essential that all who engage in this pursuit should have a practical knowledge of bees and beekeeping. Modern systems and appliances will not ensure success, neither will they cause bees to work with any more energy than they would do in the most primitive of hives. They are only the means by which the intelligent and skilful beemaster can turn to the best account the labors of these industrious and useful insects.

## FORESTRY.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

History shows that the introduction of any animal, plant, or tree into a new country, with totally altered conditions, has seldom escaped without having to run the gauntlet of many mistakes and failures ere success was finally grasped as the reward of steady perseverance in spite of all obstacles and discouragements.

It could hardly be expected therefore that the practice of scientific forestry, hitherto carried out under conditions well known, and studied by its votaries for many generations, could be at once transplanted in its entirety to new surroundings at the antipodes without some mistake being made, because it has been well said that forestry is the science of observation, and, that being the case, it is at once evident that however successful it has been, when long-continued observation on known conditions has established definite conclusions and elaborated a complete and successful system, it may have to undergo more or less of modification as the result of increasing opportunities of observation afforded by the practice of this science among its new surroundings as time goes on.

The value of forest work in other lands is so well known to thinking men that only those too ignorant to understand its advantages ever question its importance: it has long ceased there to occupy a theoretical position, as may be easily perceived by even a cursory glance at the complete forest systems at work in France and Germany for instance.

Under its new environment in these southern colonies it must, perforce, work its way but steadily, as from time to time it is allowed the chance to prove its worth at various points where it affects the welfare of the people in connection with any of their manifold interests of commerce, manufacture, or agriculture. That its value to the community will only be gradually perceived appears but too probable, because its results cannot be so rapidly estimated as those of other undertakings, owing to the fact that the tree planted to-day will not, like the wheat plant, yield its harvest in a few short months, but will probably require, in some cases, the better part of a lifetime to recoup the grower by its primeest returns. In this fact is to be found, undoubtedly, the main justification for the carrying out of such work as the planting of trees on a large scale by the State. The tendency amongst settlers in these young colonies to migrate from place to place, or even to emigrate to other countries, has so unsettling an effect that it can seldom be predicted or calculated with any accuracy how long any given estate, either large or small, will remain in the hands of the same person, there being, as a rule, nothing similar to the law of entail in England existing here to ensure the continued possession of land by the same family: and, as there is but slight prospect of a planter's reaping the benefit of his labors himself, or even of his children's so doing, the inducements to launch out into expenditure for any timber supply, beyond that for the very limited home requirements, are generally considered utterly insufficient.

Here, then, the special opportunity for the State presents itself. It can reserve land in perpetuity for the planting and maintenance of artificial forests, whose highest ultimate value it can generally be assured of realising, because it need never rush its products into the market under stress of pecuniary pressure, but can bide its time for suitable openings for disposing of its timber under a well-regulated system of management, entirely free from any disquieting apprehensions of loss of the fee-simple of its landed property. Forestry, rightly understood and efficiently carried out, is productive of great good to the

community. It presents many aspects which are full of interest and of great importance, but the special points which seem most to command attention here and now are the production of timber for commercial purposes, together with the increased opportunities for the employment of labor which such production offers, and the great assistance rendered by the planting of trees in ameliorating the inhospitable and trying conditions under which many settlers' lots are cast in the country districts, as well as the powerful aid which the rearing of certain fodder trees can give to stockowners in successfully stemming the torrent of starvation which, in times of drought, frequently threatens to engulf their stock of all kinds in one common overwhelming destruction.

As opportunity may offer, brief reference will be made from time to time to various matters in connection with the aspects of forestry now indicated, with a view to show that, though its work may possibly vary in some directions, when compared with that carried out in other countries, and be somewhat limited in others, there is yet abundant scope for its systematic practice over a wide field of usefulness here in spite of the unique difficulties which South Australia has been the first to face as the pioneer of forestry in the Southern Hemisphere.

## ORCHARD NOTES FOR AUGUST.

BY GEORGE QUINN.

The planting and pruning of deciduous trees should be brought to a close during this month.

In starting an orchard for commercial purposes, only a few varieties of any fruit should be planted, so that a large quantity of each variety may be available.

On the plains around Adelaide only a few of the earlier ripening apples and pears can be planted with hopes of profit, as these will come upon the market before the more cheaply grown crops from the hills depress the prices. If special facilities exist for coping with codlin moth—such as level, easily worked soils in isolated positions—some of the best keeping varieties of pears can be grown to perfection.

In outlying portions of the colony the long-keeping, drying, and exporting varieties of apples and pears will be found best.

Of the earlier ripening apples, for local market only, Devonshire Quarrenden, Irish Peach, Ribston Pippin, Gravenstein, and Mobb's Royal are recommended. For keeping and exporting, the following varieties have been well proved, and have all realised good prices on the London market:—Dunn's Seedling, Strawberry Pippin, Rome Beauty, Jonathan, London Pippin, Esopus Spitzenberg, Cox's Orange Pippin, Adam's Pearmain, Northern Spy, Stone Pippin, Dumelow's Seedling, and Cleopatra. The two last-named make very fine samples of dried fruit.

In early summer pears suitable for local consumption, Jargonelle, Doyenne D'Ete, Citron des Carmes, and Early Crawford. Poire du Berriays, Gansell's Bergamot, Williams' Bon Chrétien (erroneously known here as Duchess) are well proved early midseason market varieties. Late-keeping sorts, Doyenne du Comice, Easter Beurre, Winter Colc, Glou Morceau, Josephine de Malines, L'Inconnu, Vicar of Winkfield, Winter Nelis are well proved, and the five last named have been successfully exported to London. Gansell's Bergamot and Williams' Bon Chrétien make fine flavored dry fruit.

When selecting plums only those sorts which combine drying—and, if possible, canning—with good dessert or preserving qualities should be planted,

so that the grower may, if unable to dispose of the fruit in a fresh state, save it from wasting even at the eleventh hour. Coc's Golden Drop, French Prune, Fellemberg, Green Gage, Ickworth Imperatrice, Jefferson, Kirk's, Silver Prune, Prince Englebert, and De Montfort meet these requirements. The plums of Japanese origin, such as Kelsey, Golden Heart, General Saigo, and Satsuma are grown successfully here, and promise to be prolific bearers. I would suggest that growers graft a few of their unsaleable "Blue Diamond" trees with some of these new kinds.

In peaches, good canning and drying varieties will be most profitable, for similar reasons expressed above. Foster, Muir, Elberta, Salway, Wheatland, and Susquehanna are good dryers and canners. Chinese Cling, Lady Ingold, Conkling, Nicol's Orange Cling, Early Crawford are good for canning also. Briggs' Red May, Amsden's June, Early Rivers, Royal George, Sea Eagle, Lady Palmerston, Noblesse are good dessert and local market varieties.

A limited number of good nectarines can also be grown with profit, both for sale as fresh fruit or for drying. As fresh fruit they stand carrying better than most peaches, and the taste for them is improving generally. Hunt's Tawny, Shorland's Tawny, Violet Hative, Elruge, Balgowan are well-known named sorts.

If apricots are planted it must be borne in mind that the market for fresh fruit is limited, and these ripen all at once, often making a glut in the factories to such an extent that losses often occur before stocks can be handled, so that in localities within an easy distance of markets—where very early or late ripening occurs—are the only places to recommend planting for market purposes. Newcastle Early, Oullin's Early, Red Masculine, Shipley's Blenheim are early, but fall behind Moorpark in flavor, which is the best general crop variety for canning or drying.

The following cherries are recommended by successful growers:—Early Purple Guigne, Early Twyford, Early Lyons, Knight's Early Black, Biggareau Napoleon, Waterloo, and St Margaret, but it is quite useless planting these upon our dry open plains country, for even in the cool wet mountain ranges only in certain positions do the fruits reach their best condition and the trees survive for any reasonable length of time. As far as I can gather from observations and opinions, the seedling Mazzard stock is considered very favorable on which to work the good varieties.

Figs, loquats, and gooseberries may be planted, but for the two latter fruits the season is getting late.

A fact that is frequently overlooked in pruning fruit trees the first season is that the first pruning is the most important in their existence, for usually upon the judgment shown at that time depends the future form the tree shall afterwards take. A short stem with a well-balanced crown formed of limbs each having a separate hold upon the main stem is generally admitted now to carry insuperable advantages over the "leggy" specimens of past years.

The pruning of raspberries and gooseberries should be completed at once if not already done.

As the sap begins to move the grafting of apples, pears, quinces, and plums should be begun. The methods are too well known to need comment, but the wounds should be covered with grafting wax when large limbs are cut off for the purpose of grafting.

In localities where codlin moth is present the old rough bark should, while it is wet and soft, be scraped from the stems and limbs of all apple, pear, and quince trees, and, in fact, any tree standing within 30ft. of these sorts should be cleaned, the scrapings being burnt at once. All knotholes or cracks where limbs have broken—there are many of these after a heavy apple yield—should be cut smoothly and cleaned out.

Anything that could possibly harbor the pest, such as stakes, props, &c., should be removed with scrupulous care; for I am convinced cleanliness will be found the basis of the successful treatment of this pest.

The spraying of deciduous trees for the destruction of lichens, scale insects, and resting spores of parasitic fungi should be done in most parts of the colony during this month. Where mussel scale is found winter dressings with lime, sulphur, and salt solutions should be applied. Take 40lbs. fresh lime, 20lbs. sulphur, 15lbs. salt; boil 10lbs. lime, 20lbs. sulphur in 20galls. of water in large boiler for two hours, until all the sulphur is dissolved and the mixture amber-colored. Slake 30lbs.—the remainder—of the lime in a barrel, dissolve the 15lbs. salt in hot water, add salt solution to slaked lime, then add the whole to the solution in the boiler and boil for half an hour, then add water to make 50galls. for spraying. S rain carefully before using, and stir constantly when applying.

For fungoid diseases and lichens the well-known 1 in 5 Bordeaux mixture should be applied to apple, pear, plum, nectarine, peach, and apricot trees. The formula for this mixture is fresh lime, 5lbs.; bluestone, 5lbs., and in wet localities 5lbs. of treacle, honey, or cheap sugar, water to make 25galls. for spraying. Method of making—Place bluestone overnight in an open woven sack, and suspend same just under surface of water in barrel. Slake the lime slowly by pouring small volumes of water over it at intervals. Dissolve the treacle in hot water, and stir the solution into the lime when slaked. Allow to stand for a couple of hours. When about to use strain the lime-sugar mixture into the bluestone water, and add sufficient water to make the strength required. Never allow this mixture to stand over night or it will spoil. Keep stirred when applying, and see that every particle of the tree is coated with the spray.

If black aphides appear on the peach trees attend to them at once with either tobacco solution made by boiling 3lbs. refuse tobacco, 2lbs. soft soap in water, and dilute to make 12galls. for spraying; kerosine emulsion, 1 in 12; or resin compound made of 10lbs. resin, 10lbs. soda crystals, 5lbs. soft soap, water to make 50galls. for spraying.

To successfully suppress this difficult pest the treatment should be repeated at intervals of forty-eight hours until they disappear. If the peaches are out in leaf weaken the resin by adding 10galls. more of water. The tobacco may be poured around the bole of the tree as well as sprayed over the top. For aphides or black scales on oranges use resin wash as given above. As time permits the orchard should be ploughed before the weeds begin to seed; it is also a good time to apply slowly decomposing manures to impoverished soils.

The harvesting of citrus fruits should be done systematically, and fruits should be cut from the trees, not pulled, for the reason that if the twig above the fruit be cut cleanly into firm wood, fresh growth will come strongly on which flowers and fruit for the coming year will be borne.

**NECTARINE DISEASE.**—Early in December, 1896, Messrs. E. & W. Hackett forwarded some badly-diseased nectarines received from one of their customers. While the foliage was remarkably clean, the fruits, which were in the green stage and about the size of gooseberries, were much diseased. The surface seemed as if gnawed and excavated by some insect, leaving it brown, with isolated spots unaffected. A copious gumming accompanied the disease, and, while the general appearance was brown, dark-colored patches occurred. These were sent to Mr. D. McAlpine, Vegetable Pathologist, Melbourne, who states that under the microscope abundant evidence of fungi was found, two kinds at least being present, one of which probably caused the disease, and one accom-

panied it. The two fungi found are *Macrosporium epicarpium*, or black rot, and *Cephalosporium fructigenum*, the former being the probable cause of the disease. The treatment recommended is:—1. To burn all diseased fruit as soon as it appears, as the spores are in countless myriads, and are readily conveyed to healthy trees. 2. See that the drainage is good, as bad drainage is a predisposing cause. 3. Spray with Bordeaux mixture in winter, again just before flowering, and after the blossoms have fallen. This disease will probably attack peaches, and will need careful watching, as it literally skins the fruit, leaving nothing but a hard shell behind.

## THE VINEYARD.

### NOTES AND HINTS FOR AUGUST.

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

#### The Soil.

Since my arrival here it has always been my endeavor to impress upon vine-growers the great importance of early winter cultivation of the soil in a country blest with an uncommonly dry summer. To marshal up all the arguments in favor of such a practice would be exceeding the scope of mere monthly notes; it will be sufficient to point out here that the great bulk of our rains fall in the winter months from May to September, and that unless they found the soil well opened up to receive them they were in great part lost to the grower by surface evaporation or drainage. In the great majority of our districts I am of opinion that, whenever possible, the first winter ploughing, on a good deep furrow, should be completed by the end of July, and at all events not later than the end of August, so that the second or spring ploughing can be given a start before the buds burst. The past season has, on the whole, been favorable to early working: the vines lost their leaves comparatively early in the season, and we were favored with fine warm dry autumn and early winter days, which should have enabled pruning to proceed rapidly, so that when the rains did come in June and July everything should have been ready for the cultivation of the soil. During the course of the present month therefore, in carefully-treated vineyards, the first ploughing will be completed. I do not, however, disguise from myself the fact that thus far my strenuous advocacy of early cultivation has received about as much attention as the scriptural pelican of the wilderness—in the old-established districts, at all events. It afforded me therefore considerable pleasure to be informed by that enterprising vigneron, Mr. B. Seppelt, that the past season has convinced him of the efficacy of the practice I so strongly recommended, and that in future all his vineyards would be worked early. The drought will after all have done some good if all vinegrowers profit by it equally well.

The first ploughing terminated it will be necessary to start the second ploughing as soon as possible, so as to avoid rubbing off the buds whilst the first furrows are thrown against the vines. The first ploughing should heap the soil up in the centre, leaving the furrows alongside the rows of vines; the second ploughing should endeavor to reduce the soil to its original level by filling in the furrows alongside the rows, and leaving the last furrow in the centre. In a large vineyard, where it is impossible to get all over the ground before the buds burst, it is advisable to go over all the vineyard rapidly and throw back the first two furrows against the rows, completing the work later on in the season.

#### Layering.

When blanks exist in old vineyards they should be filled up whenever possible by layers. As a rule it is better to lay down the layers before the vines

are pruned, because one has a large number of shoots to choose from should the best one break. Layers are therefore preferably made in May, June, and July. In wet soils, where the layers are liable to decay before growing, they can only be put down later on in the season—during the present month, for instance. In the latter case it is necessary whilst pruning the vine to leave a shoot for a layer wherever required; these layers should be laid down as early as possible in August.

### Grafting.

In the earlier districts vines may be grafted towards the end of August, though, from personal experience, as a rule, I find September better suited for the success of this operation. I cannot too strongly recommend grafting only about 1in. below the level of the soil, and subsequently mounding over the whole graft with loose soil so as to place the top bud within 2in. of the surface. This is the practice usually adopted in Europe, but it has been objected to me that it is ill adapted to our dry climate. No one can question the dryness of the past season, and yet Messrs. G. Sage, of Nuriotpa. and A. R. Reid, of Reynella, had quite remarkable percentages of successful grafts after adhering to the practice here recommended.

### Planting Cuttings.

This is the month best suited to the planting out of cuttings in the vineyard or nursery. I trust more will be planted this season than was done last year, as there was quite a dearth of them, and they could not be obtained for love or money.

### Anthraxnose.

The excessive dryness of the past two seasons has put an effectual check on that much redoubted cryptogamic disease known as *Anthraxnose*, or Black Spot. This should not lull us into a feeling of false security. At the first opportunity, with the first wet spring, the disease will assail us with renewed vigor. Where the vines have shown the slightest signs of it they should be subjected to the well-known winter treatment, viz., a complete painting over, about a fortnight before the buds burst, with the following solution:—

Sulphate of iron .....	50lbs.
Sulphuric acid .....	1 pint
Water .....	10galls.

## THE FARM.

### SEASONABLE NOTES.

By W. LOWRIE, M.A., B.Sc., PRINCIPAL ROSEWORTHY  
AGRICULTURAL COLLEGE.

How many things by season season'd are  
To their right praise and true perfection!

In no sense are these notes intended to be a calendar of farm operations in the colony, or a monthly *précis* of farm practice. They are meant to be suggestive simply, and when they become didactic it will be in relation to the principles of practice, not practice simply so called. In every district the average climatic conditions, the characteristics of the soils, the facilities for marketing, and other conditions which experience alone discovers, determine the prevailing practice for that district. The notes are based on the experience which the College farm, on average mallee land, with a 17in. rainfall, offers, and are meant to be considered and compared in relation to the practice of other districts with the view to stimulate thoughtful practice.



Fallowing is one of the many operations to which Shakespeare's words, as above quoted, truly apply. The time of fallowing, and the condition of the land when it is first ploughed, have most important effects on the result of the work. We fallow the land for these reasons: (1) to clean it, (2) to lead as much of the rainwater as possible into the subsoil during the rainy season, (3) to promote a circulation of air and moisture through the soil so as to promote physical, chemical, and biological activity therein, and secure the ameliorating and enriching influences in full effect; and (4) to conserve moisture. Now all these effects are more marked the earlier in the season the work can be effected. In late fallowing there is less germination of the seeds of weeds, and instead of having the opportunity of killing two or three successive crops, the late fallower can kill only such weeds as have germinated before ploughing, and a few which may germinate in the land before the hot dry weather sets in. The winter feed secured from the land when fallowing is delayed is not worth a half bushel of wheat per acre, but judicious early fallowing will increase the yield by several bushels per acre. The land late fallowed does not through the summer become sufficiently mellow and consolidated to be in the most fit state for the sowing of the cereal crops in the autumn. On light lands, such as the average mallee land, I have a firm conviction this late fallowing is conducive to take-all. If the land is lifted early much of the winter rainwater gets down into the sub-soil instead of flowing off from the surface and carrying off with it in suspension and solution much of the valuable fertilising material. Our lands are not underdrained, and therefore, even where the rainfall is considerable, the soils are not reached, and the risk of valuable nitrates being carried off in the water flowing from the drains is no risk to us. This is indeed an argument, and one of the strongest in some countries, against bare fallowing, and it does not concern us here. The circulation of the air and moisture through the soil is most important. Inorganic elements of plant food, such as potash, are made available through the oxidising action of the air, and the solvent action of the water and nitrification—that is, the conversion of inert nitrogen in the soils into active form or nitrates—proceeds more rapidly. Further, the microbes which play a part so important in our soils find through this aeration, and the presence of inorganic material in soluble form, conditions more favorable to their activity, and with the approach of warm weather their activity proceeds apace. Contrast with this late fallowing. The warm weather is on us ere it is finished; the plough turns up a moist surface for evaporation, and the drying air plays practically to the bottom of the furrow, unless the land is cultivated and harrowed right away; the microscopic germs are in conditions unfavorable to activity, and less nitrogen is stored up in the land; the land until seedtime never works so mellowly, and altogether the tardy fallower reaps the result of his delay in a sickly, pale-colored, dirty, and inevitably relatively a poor crop. Early fallowing will not always ensure a clean crop. Last year's fallowing is a case in point, and crops this year are dirty; yet we have the satisfaction of knowing that we "have been beforehand—that we have done what we could." The last advantage in the list enumerated in favor of fallowing is for much of our country the most important. The rainfall is barely sufficient for a good crop, and thorough fallowing is, I believe, a means of conserving moisture sufficient to equal an increase of from 2in. to 3in. of rain in the succeeding season. It is this fact that has led the great majority of our best farmers to consider *thorough fallowing the key to success in cereal growing*; and cereal growing is the all important part of our cropping. Most men who take time by the forelock will have finished fallowing, and many this year are earlier than usual in order to get the heavy work over before their haystack was finished. "It is an ill wind that blows nae gude," and next year's results, with a fair season, will testify to the truth of the proverb. I wrote just now

*heavy work*, for early fallowing should be deep if the subsoil will admit of it. There is time for the soil to become consolidated during after working, which is not the case when land is late fallowed. This year we have worked a field here to a depth of 8 in. We took a heavy three-furrow stump-jumper and improvised mould boards specially for the work so cut away below and at the heel as to turn only the top soil and leave the lower soil merely stirred. The work, in fact, is a combination of subsoiling and ploughing, and past experience leads me to anticipate good results from it next season, and better still in succeeding years.

Other work now requiring attention will include—(1) Harrowing or horsehoeing wheat crops, (2) rolling, (3) second working of the fallows.

1. Wheat crops this year, as already indicated, are likely to be relatively dirty. Last year's dry season gave us little or no opportunity of cleaning the fallows, and the autumn rains came so late that it was undesirable to wait for the germination of weeds before sowing. A good harrowing at this time of the year, if a few days' sufficiently dry weather comes to allow of teams working on the wheat without sinking too deeply into the land, will be found to help considerably towards cleaning the bottom. Smaller weeds are just at that stage that the harrows root many of them out readily, and further, the wheat will be invigorated by the operation; it will stool better and grow more freely. Where the crop has been drilled the horsehoe should be kept active whenever the condition of the land will admit of it. This is a more efficient way of cleaning the crop than harrowing, but it is, of course, much more tedious and more expensive. Where a man has a large area, I believe he will do well to let the horsehoe alone and be content with harrowing, inasmuch as weather suitable for the work is likely to come in very brief periods, and unless the opportunity is taken to get over a large area in these short periods much of the work must of necessity be left undone.

2. *Rolling*.—This is a necessary operation wherever the crop is to be cut for hay, if the desirable bottom is to be secured. Apart from this advantage, I am not altogether satisfied that rolling on average wheat lands secures an advantage sufficient to repay the expense; on light lands, on the other hand, heavy rolling is desirable. It firms the land and brings about a condition more congenial to the habit of the wheat plant. Looking at the matter from the point of view of pure physics, rolling will be recognised as a means of leading water from below to the surface. For a short time after rolling the surface will contain, therefore, more moisture, and the plants at first will benefit; but later it will be found that the exhaustion of moisture is slightly quicker on rolled land than on land not so treated. In some cases where the seed bed did not work down readily, and the weather has blown up dry, rolling may not have this effect, but in so far as it crumbles down the dry lumps of soil on the surface, and breaks to a small extent the hardened surface, it may leave a kind of mulch of soil on the surface, and so diminish the evaporation. This, in fact, was noticed on our northern areas last year, and may be looked upon as an exceptional circumstance.

3. The second working of the fallows may be done by a light cross-ploughing, or by deep cross-cultivating with a chisel-tined cultivator. I am inclined to favor the latter alternative, though I have carried out no definite experiments in the matter, nor have known of such being done heretofore. Whatever method is adopted, if it be done within the coming month, will, I know, be beneficial. It is not sufficient to simply plough the land, let sheep run over to keep the oats down, and scarify it before haytime; the full benefits of fallowing are derived as much or more from the after working than from the first ploughing. It has been advanced at various times in agricultural history that thorough working of the land will enable a farmer to go on with alternations of bare fallow and crop, growing maximum crops. While one cannot endorse to its

full extent this extreme doctrine, one at the same time recognises that it is a means of lessening the amount of manure required, and securing conditions most conducive to the best results under judicious manuring. The summer scarifying on fallows is purposely shallow to secure a soil mulch and lessen evaporation. Cross-working now is largely with a view to aeration of the soil, and while it is moist and mellow, on most lands it cannot well be overdone.

Another question which will be engaging the attention of many farmers now is that of the preparation of the land for summer crops. Where the average rainfall is under 15in. or 16in. it is inadvisable to practise summer cropping. The crop undoubtedly dries the land, and the after-crop in low rainfall districts suffers.

This summer cropping, therefore, is a question for those that are favored with a high rainfall. Next month will be sufficiently early for full notes on this question. In the meantime, no better preparation for such crops can be devised than thorough working of the land as if for a bare fallow.

## SALE OF ARTIFICIAL FERTILISERS.

The attention of buyers and sellers of artificial fertilisers is specially directed to the following clauses of the Fertilisers Act, 1894:—

Clause 1.—(1) Every person who sells for use as a fertiliser of the soil any article manufactured in the said province, or imported from abroad, shall sign and give to the purchaser an invoice stating the name of the article, and whether it is an artificially-compounded article or not, and what is at least the percentage of the nitrogen, potash, phosphoric acid in soluble form, and insoluble phosphoric acid respectively, if any, contained in the article; and this invoice shall have effect as a warranty by the seller of the statements contained therein. (2) For the purposes of this section an article shall be deemed to be manufactured if it has been subjected to any artificial process.

Clause 2 provides that if any person fails to give such invoice, or causes or permits any invoice or description of the article sold by him to be false in any material particular, shall be liable, without prejudice to any civil liability, on conviction, to a fine of not more than twenty pounds; and, on any subsequent conviction to a fine of not more than fifty pounds.

The regulations under the Fertilisers Act provide that any buyer of a fertiliser may have the same analysed by the Agricultural Chemist, at the School of Mines, for a charge of 3s. for each determination; that is, if the buyer wishes to ascertain how much nitrogen the fertiliser contains he must pay 3s., for potash 3s. for phosphoric acid 3s., or for any two or three he would be charged 6s. or 9s. respectively; and if the analysis does not bear out the statement in the invoice these fees have to be paid by the seller.

## POULTRY.

BY D. F. LAURIE, POULTRY EXPERT.

Profitable poultry-keeping depends entirely on system. First of all a suitable position must be selected; then suitable roosting houses and nests must be provided. It is of no use expecting poultry to thrive in bleak, exposed, or draughty situations; as much shelter (bushes for preference) must be provided as is possible. It is also certain that if the houses or sheds in which the birds sleep become infested with vermin, such as lice, mites, fowl fleas, tick, and bugs, the birds cannot be expected to thrive; therefore it is cheaper and better in every way to erect such buildings as offer the least harbor to such pests, and as are more easily cleaned and disinfected. On no account

should overcrowding be allowed; perfect ventilation without draught is also necessary. On the question of breed, certain varieties are justly famed for certain excellence. Of the sort suitable for producing high-class table poultry, such as is especially preferable for the export trade, the Dorking stands easily in the front rank. There are four varieties—the colored or dark, the silver grey, the white, and the cuckoo; of the first two, eggs or young birds excellently bred, are now procurable in South Australia. Cross-bred birds (that is the progeny of two pure varieties) are often of more hardy constitution and quicker to mature; both great considerations. We produce such a bird to a high degree of perfection by mating the Indian Game, or, as it is sometimes known, the Cornish Game, with the Dorking. The cross so produced is in every way excellent; hardy, quick-growing, and possessing abundant flesh of the highest quality and color; the skin is white, and as a rule so are the legs and feet. Although the Indian Game in its pure state has yellow legs, breeders often find color a difficulty, and crossed with the white-legged Dorking the legs of the progeny are sure to be white. As a table fowl the Indian Game pure is of a very high order, but the hens do not lay so well as Dorkings. This cross is the one which sells best of all in the English market, is most liked by the leading poulterers, and wins at the table-poultry shows. There are other breeds and crosses of great merit, but not equal to these. Other suitable birds are Orpingtons, Langshans, and Wyandottes, and many good table birds are bred from Brahmas crossed with Dorkings, as the above should be, or with Indian Games. Where one has not the means to purchase much pure stock, it is a good plan to select, say, seven or nine large square-bodied, fine-boned, white-skinned hens of fine quality, and fine in head, and mate with a large, active, vigorous Indian Game or Dorking cockerel; the result should be fair and perhaps excellent table fowl. These breeding pens should be kept to themselves, and only these eggs used for incubation.

Where egg-laying is the main feature, it will be found to be a matter of strain more than breed. Hens of many varieties will often be found, also common hens, which will lay a large number of eggs in a year. On finding such a hen, breed from her; her pullets will do likewise. The cock birds should also be bred from good layers. By care and attention to this matter, and by constant selection, and discarding all hens not up to the mark as layers, a large mob of birds can soon be bred with a high laying power. The Mediterranean breeds, such as Minorcas, Leghorns, and Andalusians, are noted as layers; they are also non-sitters, are very precocious, and consume only a moderate amount of food. Good specimens of good laying strains are easily procurable, and a cockerel of any of these varieties, bred from a good layer, and then mated with eight to a dozen of the best layers on the farm, will produce pullets of superior (and earlier) laying powers to common birds.

Duck-breeding is a profitable occupation if carried out on proper lines. Good stock must be used for breeding from, so as to have size, quality, and early maturity. Ducklings should be fit for market from eight weeks of age. The most esteemed variety in England is the Aylesbury; the Pekin is also much in favor—both are of great size and excellent quality of flesh. The cross between the two is very hardy and quick-growing. Another breed, the Indian Runner, a fawn and white bird, is remarkable for the great number of eggs produced. They may be used to improve the egg-laying of other breeds, but, although the quality of the flesh is excellent, the birds are very small, weighing about 4lbs. as adults, not half the weight of a good Pekin or Aylesbury; however, they mature very early.

Owing to the severe season we have just passed through great numbers of poultry have been killed off, and have died of disease; there is the prospect of good local markets in addition to the export trade. In reply to the question

as to who should keep poultry, it may be answered—Everyone, especially farmers and gardeners. Less would then be heard of insect pests and hard times. Well-bred poultry, which always command a profitable price, as a rule cost less to keep and rear than scraggy mongrels, which yield neither eggs nor meat. The gradual improvement in quality throughout the colony is much to be desired. Large numbers of birds reach Adelaide from the country; the superior sorts always sell well, while the inferior birds can hardly return expenses.

It is quite time that hatching operations were in full swing. Nests must be provided in secluded corners, as the hens do not like laying in public. The nests are best if on the ground, and may be scooped out and lined with grass or short straw, a sheet of iron placed in front for privacy. At all times be on the lookout for vermin. Provide a dry dust bath in a sheltered position. The birds enjoy dusting themselves; it destroys vermin and keeps them healthy. Apply kerosene, carbolic acid, Little's phenyle, or Quibell's compound to any woodwork, or frequently limewash the insides of houses and also the perches, etc., with hot limewash, to which may be added alum, or sulphate of iron (copperas). Do not put kerosene near a sitting hen or her eggs; if she is worried by vermin use a little insect powder or flour of sulphur. Keep a full supply of sharp sand and grit as aids to digestion. Hens are very fond of charcoal; it is antiseptic, and promotes digestion. Lime is a constituent of the egg-shell, and must be provided in some form or other, such as old mortar, ground bones, crushed sea and oyster shells. Green bone (uncooked), cut fine, and given at the rate of  $\frac{1}{2}$  oz. per hen three times a week is excellent for filling the egg basket; such bone is not suitable for growing stock, as it contains too much oil. Fresh clean water must be always at hand and kept well shaded; any disregard to this important matter will end in loss. Green food is also a necessity, and may consist of grass, cabbage, kail, lettuce, &c. Do not use pepper, spices, and egg foods; such are only to be used in case of colds, which are the result of carelessness on the owner's part. House well, feed judiciously, provide all that a bird in a state of nature would get, such as grit, grass, &c., and the birds will pay, and no physic will ever be needed. Regularity is also a great point to be remembered in feeding. Food should be as varied as possible, and notice taken if each bird is doing well and getting sufficient. Neither overfeed nor starve. All food must be sound and wholesome, and should not be thrown on dirty ground.

### CAPONS AND CAPONISING.

*(Condensed from New South Wales Agricultural Gazette, Vol. IV., p. 722; illustrations kindly loaned by Agricultural Department of N.S.W.)*

The writer (sub-editor, Samuel Gray) maintains that poultry for table should be sold by weight, and that it is more profitable to raise one fowl of 9lbs. than to raise two fowls of  $4\frac{1}{2}$  lbs. each. The object of caponising is to increase the quantity and improve the quality of the flesh. He suggests that turkeys and ducks also might be profitably caponised. In some exhaustive trials, made at different experimental stations connected with the Department of Agriculture of the United States of America, with various breeds and cross breeds to test whether or not it will pay to caponise, the conclusion arrived at by the Rhode Island Experimental Station was that "These experiments show less gain in weight as the result of caponising than we were led to expect by published accounts. The tender flesh and the ability to take on fat seemed to be the only gain of importance." The cockerels were caponised at an average weight of 8 $\frac{1}{2}$  lbs., and the tests were made against a like number of cockerels of similar varieties fed with similar food under the same conditions. One notice-

able fact was that, while the younger or smaller birds recovered more quickly from the operation, the larger birds, after recovery, made the more rapid and profitable growth. In America, early in the season, high prices rule for "broilers," or "spring chickens," but it is considered that the surplus cockerels will give greater profit later on if caponised and sold before growth has ceased. "After caponising, the labor of caring for and feeding is but little more than in feeding cattle or pigs, and the proportion of labor to produce 100lbs. of broilers, as the latter have been most of the time with the hen or in brooders. As the demand for capons does not come from those who are looking for the cheapest possible animal food, it is evident that efforts should be made by any grower towards improvement in quality, and the most successful and profitable competition will probably be in this direction."

The labor required in feeding capons is less than with young chicks. The cost of caponising is small where expert services can be obtained, and an expert should be employed where possible. . . . Anyone endeavoring to teach himself should operate on several dead cockerels before attempting to operate on a live one.

The largest breeds will be found the most profitable for capons, and it is useless to caponise cockerels of the smaller breeds.

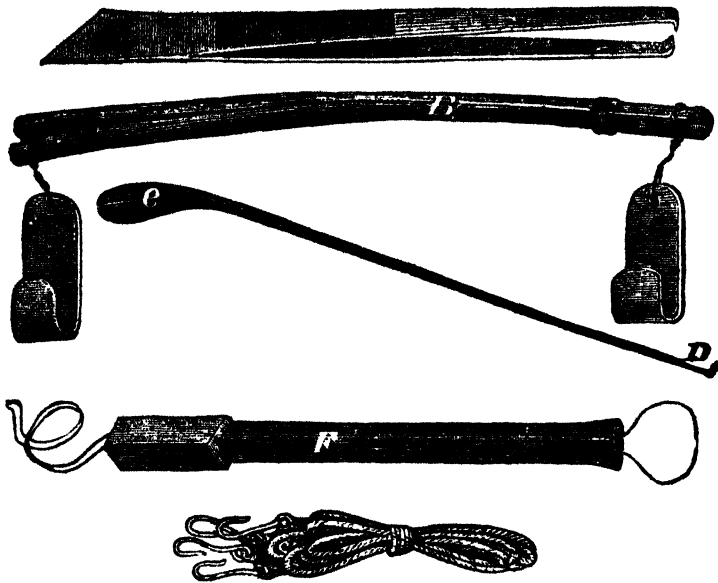
Skim milk can be profitably fed to capons in large quantities if it is sweet. The dishes, &c., must be kept scrupulously clean; give a variety of foods to capons. The cost of feed is approximately  $2\frac{1}{2}$ d. per day for each 100lbs of capons after they have reached their full size.

The Rhode Island Experimental Station reported that, by following the book directions, caponising is easily and quickly performed, but more so after witnessing the operation. Birds apparently suffer but little pain, and the percentage of loss is small. The birds grew larger in frame, matured later, became quiet and contented, did not crow or fight, and their flesh remained soft and tender. Birds of 2lbs. or less were most easily and safely caponised, but the larger the birds, provided they have not commenced to crow and their combs had not developed, the more quickly they recovered. The only birds that died under the operation were those that had commenced to crow. The old Chinese tools, when their use is understood, were found the most satisfactory of all. Brahma-Cochin cross birds did not equal the untreated birds in weight until seven months had elapsed, and in ten months they did not average 1lb. heavier. A Langshan rooster, one-sixth of a pound heavier than a capon of same breed at same time, kept ahead of the caponed fowl for seven months. A Plymouth Rock capon equalled the roosters in weight in less than two months, and gained on them the rest of the season, but did not average more than  $\frac{3}{4}$ lb. heavier at any time. Indian Game capons were five months in catching up with the roosters, and were not  $\frac{1}{4}$ lb. heavier at eight months after the operation. Brahma-Cochins gained the least during the first year, but made the largest and heaviest birds at the end of twelve months. The Langshan was less affected by the operation, but was larger at the time it was performed. The Plymouth Rocks recovered less readily, but they were operated on when the weather was warmer—fifteen days later than the Langshan. Indian Game and their crosses were harder to do, and should be taken when younger. The conclusion was that there is less gain in weight than was expected. Capons come in when the market is bare of fresh summer-raised poultry, and they furnish a large tender roast, and command a high price. Of the superiority of the flesh there is no doubt.

### Caponising Tools.

There are many patterns of caponising tools on sale, but experienced men give preference to the simple old-fashioned Chinese instruments, comprising a knife or scalpel for making the incision; a whalebone, with hooks at each end, to stretch the ribs apart or hold the wound open; a hook to tear the thin

film-like membrane lining the abdominal cavity; forceps to pick up and help tear the thin membrane covering the testicle; an elevator or spoon-like probe to draw the lower testicle into view, to assist in passing the hair over the gland, and to scoop out blood, feathers, or particles that should be removed from the cavity; and a tube or canula to hold and direct the horsehair loop by which the testicle is torn off. To save picking up so many different tools the knife and forceps are usually combined in one, also the spoon and hook (*see illustration of Chinese implements*):—



A, knife and forceps combined. B, whalebone spreader; C, cords for fastening birds, furnished with most sets, but not generally used; D, hook for tearing the thin skin; E, spoon or elevator, combined with D; F, canula, or tube with horsehair loop which is passed over the testicle projecting from the point, and the part which is grasped by the fingers projecting from the square top or butt by which the tube is held.

The illustration above shows too much curve in the forceps at the points. The points should be thin, narrow, and fit each other perfectly, and about 5 in. in length from the blade, so that the hand may not come too close to the opening and obscure the light. This instrument should be good enough to take hold of the thin skin on the back of the hand without letting go when pulled upon.

The whalebone spreader is far superior to any wire spreader. The sliding ring is used to increase or decrease the tension. The whalebone must necessarily be rather stout and elastic. The ribs of large birds are stiff, and cannot be spread very much, while those of small birds are so pliable that they will bear a considerable stretching without injury, and in such case the opening need not be so large.

The spoon should be widest near the tip, and as wide as the average testicle is long, or it will take a long time to get the loop round the gland. It should be somewhat hollowed, but not too deep. The bottom of the bowl should be smooth, and curved like a teaspoon, so that the loop may easily slip over it. The stem should be rough to prevent slipping in the hand, not too thin, and about 6 in. long. This instrument, with the pliers, has much to do with the operator's speed.

The tip of the canula should be slightly flattened and wider than shown in the cut, and have holes in the extreme corners. Between these holes is a smooth surface, slightly rounded, so that the hair when it is drawn up tight will hug closely. The expert will want several of them, having different widths at the point. Some testicles are long, like a grain of oats, with an attachment at each end; while others are shaped like a kidney, with both attachments near together at the hollow side. If a tube having the holes close together is used with the former the gland is likely to double up and break when the hair is tightened, and a part slip through the loop, and, remaining, a "slip" is produced. For such shaped glands a tube with its tip as wide as the gland is long should be used. With wide tips the attachments are snapped separately when the tube is twisted; but when the holes are close together the attachments are liable to be twisted into one strand, and are then harder to break. The holes in the tip should be very smooth, or the horsehair will be quickly worn through. It is best to use two hairs; but some use one only, and this is liable to break. The best hair may be secured from the tail of a large coarse-haired horse; those from the tail of a mare are liable to be brittle. Two or three canulas, ready strung with two hairs each, should be kept, and the ends projecting through the square end should be tied so that both hairs are exactly of the same length, whilst the loop at the other end should be no larger than can be drawn taut by the forefinger of the left hand that holds the tube. The squared end roughened is necessary to enable one to grasp it firmly and twist it easily. These tubes are usually nickel-plated.

### Best Age and Weight.

Cockerels about three months of age, or weighing from 1½lbs. to 2½lbs. each, are most suitable for the operation. Birds whose combs are undeveloped, and that have not commenced to crow may be operated upon at a much greater age and when weighing 4lbs. to 6lbs. As breeds differ, maturity rather than age should be considered.

### Fasting.

Cockerels should be deprived of all food for thirty-six or forty-eight hours previous to the operation. The time depends upon the way they have been fed and the amount of range allowed them. If the bird is to be opened on each side twenty-four to thirty-six hours is quite sufficient. It is preferable to fast them forty-eight hours and remove both testicles from one opening. By fasting the bowels are emptied, so that they are not in the way or do not cover the organs. The volume of blood in the veins and arteries is also lessened, so there is less bleeding, and the inflammation caused by the wound is not so great. It is important to deprive them of all water as well as of food.

### Operating Table.

When only a few birds are to be treated a box, or anything of the right height, will do. When a number have to be dealt with it is most convenient to have a table with a drawer for tools (and with folding legs if used for travelling from place to place). It should be waist high to the operator, about 24in. long by 14in. wide. A thin strip, projecting above the edge at the back and half-way across the ends is desirable to keep the tools from rolling off. On the left edge of the table, and about 3in. from the front corner should be fastened a loop large enough to easily admit the wings and head of the bird. This may be formed by nailing together both ends of a strap or cord 15in. to 20in. long to the edge of the table. To fasten the legs, provide a strap punched with holes an inch apart the whole length, with a tongueless buckle at one end. At the right end of the table and 4in. or 5in. from the front corner are driven several wire nails having small heads the size of the holes in the strap. These are bent slightly backward.



### Proper Light.

A bright cloudless day should be chosen for the work. The best time is the latter part of forenoon, but may be conducted nearly all day. A place out of the direct rays of the sun should be selected, where the light is at its best. In the direct sunlight the organs may be seen more distinctly, but the shadows thrown by the head, hands, and tools interfere with the work.

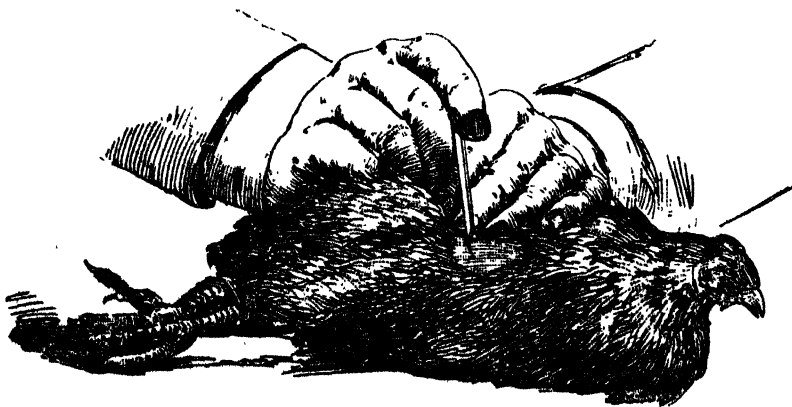
### Preparations for Operation.

The birds having been confined and fasted the proper time, quietly catch each one as required. If chased, left exposed to the hot sun, or transported by express previous to the operation there will be more bleeding, and the work will be hindered.

To fasten the bird to the table pass his head and wings through the loop at the left, draw him back to tighten the strap, lay him on his left side with back to the operator, draw out the legs, put the strap noose over them above the hock or knee joints, draw it sufficiently to stretch the bird, and button the strap over one of the nails on the right side of the table. If the loop for the wings is too large a couple of twists will reduce it. In fastening the legs the upper or right leg should be drawn back further than the left.

### Performing the Operation.

The bird having been fastened with its right side up and with back to the operator, pluck a few feathers from a small space in front of the thigh joint to expose the skin, a space of about  $1\frac{1}{2}$  in. square, over the last two ribs. Remove them with one or two quick twitches, as if picking a dead fowl. During this part of the work the bird makes more fuss than at any other time. Before cutting, some operators chill the skin by wetting the bird's side to prevent bleeding. This would also aid in preventing the feathers from blowing up in the way. Locate a point between the last two ribs and in line with the hip and shoulder joints, or an inch from the backbone, then with the left hand draw back the skin towards the hip (to get the muscle out of the way and so that the skin will slip back and cover the opening after the operation) and insert the knife, held by the right hand, through the muscle between the ribs. Make a cut an inch long toward the end of the ribs. Beginners should practise on dead birds first.

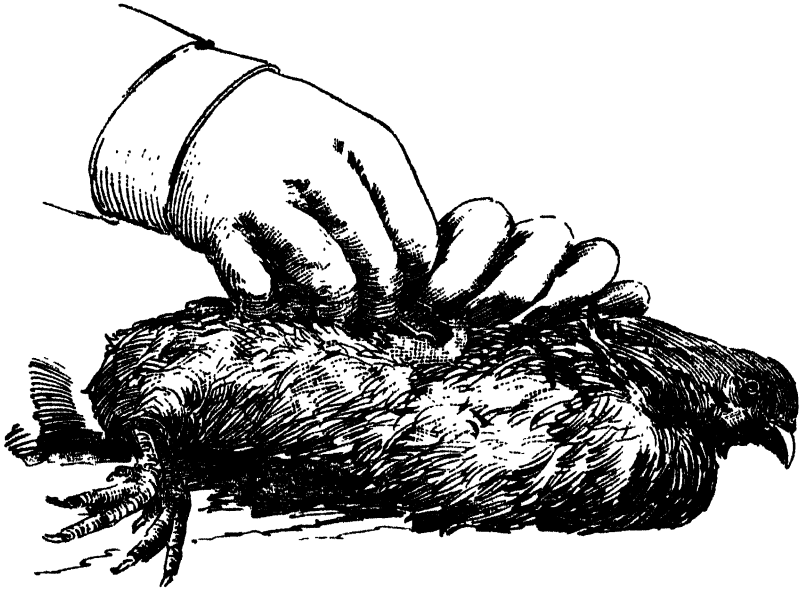


INSERTING THE KNIFE.

After a little practice the skin and two layers of muscle may be severed at one stroke. If done by several insertions of the knife one layer may draw over another when it is removed, and the skin over all, making it difficult to complete

the cut without there being several unnecessary incisions. One clean cut that will lay open the cavity may be made with safety without danger of touching the bowels if they are empty. If by mistake the cut is made one rib too far forward the lung will probably be pierced.

Now introduce the spreader and draw apart the ribs. Push one of the blunt hooks between the ribs into the cavity and draw it back against the edge of the



INSERTING THE SPREADER.

wound next the hip, then bend the whalebone around to the other side, now press down on the hook already in place to depress the last rib (which is the most pliable), and from the outside catch the other hook on to the other rib or the opposite edge of the opening. If necessary lengthen the cut by passing the knife round the point of the next to the last rib, or cutting towards the back.



EXTENDING THE OPENING.

If cut too close to the back the chicken is weakened, and if cut too far the other way the bowels may protrude later. *The smaller the opening, provided there is room to do the work, the better.*

Next to the opening will be found a ~~this~~ semi-transparent membrane, the peritoneum, which is also divided, care being taken not to touch the bowels at the end of the ribs. If blood flows from the severed muscle let it clot and remove it before cutting this membrane. This is usually torn with the hook, but we again follow the example of our New Jersey friends. This membrane is punctured near the back of the bird with the point of the knife held back downward, the spoon is then passed through this opening and across beneath the two or more layers of membrane, which are pressed up slightly and safely divided by a single stroke of the knife, the spoon beneath serving as a guard. Along this membrane run fine branches of an artery, and in cutting it is best to pass the knife between instead of across them. This is of slight importance, however.

The bowels, upper testicle, and blood vessels are now plainly exposed to view. The testicles are small, yellow, roundish bodies, shaped either like a kidney bean or a grain of wheat or oats. They are fastened to the back and to the blood vessels which surround them by thin membranes. They lie against and on each side of a large artery, which, if punctured, will cause the bird to bleed to death as promptly as if its throat were cut. The lower or left testicle should be removed first. It is slightly farther back in the cavity, or toward the rump, and if hidden may be brought in sight by pushing the intestines forward and downward. It lies between the large artery and another large blood vessel, but if raised by the spoon until it comes in contact with the thin membrane between the two blood vessels, they are left in the rear, and the membrane may be caught with the pliers, slightly drawn up and carefully torn with the hook. As soon as this is done the lower testicle is fully uncovered, and instead of a dull yellow now appears bright and shining. Now insert the tube containing the loop, holding it with the fingers of the left hand and resting the hand upon the bird. The forefinger of this hand should be free of the tube and pass through the knotted end of the loop, as it projects from the top, ready to draw it tight. Now lower the point of the tube to the testicle, with its hair loop slightly projecting, at the same time passing the spoon probe (which is held in the right hand) through the loop and under the testicle. Hold the point of the tube against the back or hollow of the testicle and with the spoon draw the testicle out so that all of it is in sight and within the loop, then tighten the hair with the forefinger, at the same time slipping the spoon out of the way that it may not be held in the loop. Then take the hair loop held by the finger in the right hand and hold tightly while the tube is held in the same position with the whole left hand, then give the tube a sharp twist with the fingers, first one way, then the other a few times, then draw the point of tube up and towards the rump slightly, and continue to twist until the attachments are loosened, then draw it out. If the cord comes with it, cut it off at the mouth of the opening, but not close to the gland. The glands should come out with the sixteenth of an inch or more of the cord attached to them.

If the upper gland is removed first, because it is easiest to reach, the blood from the small blood vessels severed covers the lower one and its removal is almost impossible without making an opening on the other side. Although the upper gland is easy to reach there is greater risk in its removal. It lies close to the main artery, and the small artery connecting it with the large is so short that there is more danger of rupture.

Slightly catch the membrane covering it, just enough to draw it up a little, and sever it with the hook. The more thoroughly the membrane attachments are disconnected the easier it is twisted out. Use the tube and loop as before. If slight bleeding follows the removal of the glands from the small blood vessels

that were necessarily severed, it will be all right, but the blood should be spooned out and as little left in the cavity as possible. If the large blood vessels are torn the "click, click" of their escaping contents will inform the operator that he will soon have a dead bird. Birds that live ten minutes after the operation usually survive. In case the comb is somewhat developed it is by some removed at the time of the operation, or the bird will look like a slip. We think, however, that such birds should not be castrated.

Care should be taken that no feathers are left in the cavity. Remove the spreader hooks in the same way that they were adjusted, unfasten the bird and, holding him by the wings or shoulders, instead of legs, mark him and put him in the coop. Do not sew up the cut. It is customary to mark them by standing them on the table and cutting off the nail or the tip of the right toe of the right foot. When we fail to remove both glands and expect the bird will be a slip, we cut off the left toenail of the left foot.

Food and water in moderation are given at once. Although grass and soft food, which is least liable to increase their feverishness, should be given for a week or ten days, give them a small quantity of whole corn for the first meal. This seems to brace them up and take away the weakness which soft food seems to aggravate if given at first. They are then confined, bedded with straw, and given soft food. They are not allowed full liberty or to roost for some time, but kept as quiet as possible. If overfed at first, or caught by the legs, protrusion of the bowels beneath the skin may be expected, unless the opening was a small one.

The outer skin usually comes together and scabs over in a day or two, and then they are liable to have "wind puff." Air or gas accumulates under the skin and puffs them out like a balloon. This should be pressed out after pricking a hole in the sound skin with a penknife. It should be watched for the first two or three weeks, and the bird relieved as soon as it appears. Some may have to be pricked several times. If not relieved the pressure brings on other troubles, and the bird may be lost.

In operating by lamplight with the aid of the head mirror, the light is placed 2ft. to 3ft. away and about 1ft. higher than the table. The greatest advantage in using artificial light is in the winter, when the weather is severely cold and windy. Outdoor work is then impossible. A skylight would enable one to work indoors in comfort on bright days, but the head mirror enables one to work at any time.

The operation fails principally by the bursting of the skin which encloses the soft matter of the testicle. If part of the covering and some of this glandular structure remains unsevered something like a testicle grows in the place of the gland. Where this occurs the birds (slips) cannot usually reproduce, but the nerves live, and sufficient sex remains to cause them to crow and pay as much, or more, attention to the hens as a rooster. The older the bird the less danger there is of breaking the testicle, but there is more danger of his bleeding to death. The glands as they grow larger increase very little in length.

Slips vary in quality; some are about the same as a capon, while others are about like a rooster. They grow large more quickly than a capon. Slips sell at a price midway between that of fowls and capons. A good slip is better than a poor capon.

When working on small birds some operators surround both glands with the hair loop at one time and remove them together. The formation of fowls differs very much. In some the thigh covers the last rib and must be drawn back to make the cut. We do not like to open both sides of a bird. If opened on the left side the position of the organs is reversed and the operator does not work as readily, but when the birds are found unusually full, or the glands are very large, it is sometimes advisable and in some cases is the only way to complete the work. Usually no more than 1 per cent. or 2 per cent. of the birds are lost from the operation.

## THE INTERCOLONIAL CONFERENCE OF FRUITGROWERS.

BY THE GENERAL SECRETARY.

Having been approved by the Hon. Minister of Agriculture, upon nomination by the Bureau, as a delegate with Mr. George Quinn (Inspector of Fruit) and others to attend the Intercolonial Conference of Fruitgrowers, to be holden at Brisbane on June 12, 1897, I took advantage of the occasion to visit the Experimental Farms at Wagga Wagga and Richmond River, in New South Wales, as well also (in company with Mr. Quinn) to inspect a number of orchards and gardens in New South Wales and Queensland.

Leaving Adelaide on June 3, I arrived in Melbourne next morning, and, after delivering a few parcels of entomological and other specimens to various officials, and paying respects to the Secretary of Agriculture and others, went, on same day, to Benalla, 122 miles, to avoid the early start at 6.15 a.m. from Melbourne next morning, stopping at the Benalla Hotel, which was very comfortable.

At about 10.45 on June 5 took the mail train for Bomen, which is the nearest station in New South Wales to the Wagga Wagga Experimental Farm. Here Mr. George Valder, the gentleman then in charge, met me, and after a five miles drive we arrived at the farm, where I stayed over Sunday and Monday at his residence. There is a good deal of nice arable land in this locality, generally favored with good rains, but its distance from a seaport and market discounts some of its advantages. The soil is as good as most of our land near Anlaby and Kapunda.

The Wagga farm comprises 2,500 acres, and 1,000 more can be added. At the college there were twenty-seven students, and they cultivate, under supervision of several instructors, over 1,200 acres of crops of several kinds, together with eighty-five acres of fruit trees, and twelve acres of vines. Provision is being made for erection of a winery and the planting of a larger area of vines—especially those considered to be best suited for claret types of wine, for which the locality appears to be well suited. There is a dairy herd of eleven cows and a bull, and a considerable number of pure Berkshire pigs are bred here. For the heavy work of clearing, levelling, and grading, and for sinking a large reservoir intended for irrigating, a powerful team of bullocks is kept; and for ploughing and other standard farm work there are numerous teams of horses. Smiths', carpenters', and other workshops, under skilled teachers, employ a portion of the time of the students, and the dairy, slaughterhouse, chaffcutters, and many other institutions keep them profitably engaged when not engaged on the land or otherwise at work or study.

Nearly the whole of the buildings on this farm are of wood, and there is ample accommodation for students, masters, principal, live stock, implements, grain, seedroom, haystacks, offices, &c.

The experimental plots are most interesting, and were being carried out upon the most perfect scientific principles by Mr Valder under the directions of Dr. N. A. Cobb, Vegetable Pathologist to the New South Wales Department of Agriculture. Amongst many other items, Dr. Cobb has initiated "stud" plots of wheats, from which he constantly culls the best samples and cultivates or "educates" to a still higher degree of perfection. These are divided into classes A, B, and C, of which those varieties under A are the best. Wheats and other cereals are grown commercially also, and best sorts of wheats for the locality are sold to farmers. It has been already found that certain sorts are better suited to the climate than others that do well in warmer country.

A large number of grasses and fodder plants are grown experimentally, amongst them being several varieties of saltbushes, which thrive well on the deep gravelly soil resulting from decomposition of granite rocks. Amongst the grasses *Andropogon sericeus* and *A. pertusus* do well, and so also do the native Mitchell grasses (*Astrebla pectinata* and *A. triticoides*). There are fifty-one indigenous grasses and fodder plants under experimental cultivation, but the above-mentioned do best so far.

Some of the students were engaged in treating seed wheat for prevention of "bunt." They had two cauldrons of nearly boiling water. One was kept steadily at a temperature of 132° to 135° F. by addition of hot water from the other, and the bran bags, holding 1½ bush. of grain, were kept immersed and agitated in this for just fifteen minutes. I thought the process too slow, and that our bluestone pickling is cheaper, quicker, and quite as effective. Most, if not the whole, of the crops here are sown with a drill made in New Zealand.

A commodious laboratory and offices for Dr. Cobb and assistants have just been completed; a rather imposing granary and elevator is in course of erection, and it is intended to build a college on a hill close by, which will be visible for a long distance around. This overlooks the plots that are to be irrigated, where a large vegetable garden also exists, as well as the extensive orchard and vineyard already mentioned.

On Sunday night Mr. Valder was so kind as to drive me seven miles over a rough and rather dangerous road on a dark night to Wagga to catch the express train, which was supposed to pass through at about 1.40 a.m. On arrival we discovered that the express only goes from Sydney to Melbourne on Sundays, so I returned with pleasure to the farm, and we went to Bomen on Monday evening, where I took express to Sydney, arriving there before daylight on June 8.

During the day I saw the Hon. Sydney Smith, Minister of Agriculture, and had a long conversation with respect to the objects, constitution, and working of our Agricultural Bureau, and he was so kind as to give me an outline of his Government proposals to endeavor to organise the Agricultural Societies in a somewhat similar manner. Mr. J. L. Thompson, Principal of Hawkesbury Agricultural College, had just been appointed Instructor and Lecturer on Agriculture, and would visit the societies, and, if possible, induce the members to hold monthly meetings, prepare and read papers, and generally conduct agronomical business on similar principles to those of the Branches of our Bureau. In the event of refusal or neglect to comply with these conditions the annual grant or subsidy from the public funds would be stopped.

By the way, Mr. George Valder, of Wagga Wagga Experimental Farm, has since been transferred to the charge of the Hawkesbury College, &c., in place of Mr. J. L. Thompson.

On the same day I interviewed several officers of the Department of Agriculture, and arranged a number of reciprocal matters—exchange of seeds, publications, &c. Also visited the Botanic Garden, and was kindly taken through the various departments by Mr. J. H. Maiden, the Director. On the whole, the Adelaide Botanic Garden, though lacking such opportunities for landscaping, is prettier, cleaner in regard to scales and pests, and, I think, better arranged; but there are some remarkably large Norfolk Island pine trees, palms, giant bamboos, &c., in the Sydney Garden.

On July 9, in consequence of a telegram received, I waited in Sydney till 4.30 p.m. for the purpose of going back with Mr. J. L. Thompson to the Hawkesbury Agricultural College, and consequently had time to interview the Government Economic Entomologist (Mr. Froggatt), Mr. R. Etheridge (Director

Australian Museum), and several other officials. I would advise any intending visitors to the Hawkesbury Agricultural College to avoid the mistake made by myself. I took train for the Hawkesbury River, which is quite a different direction. Train should be taken for Richmond, which is near the Hawkesbury River at another point, and is the nearest station to the Hawkesbury Agricultural College.

Next morning, June 10, went back to Strathfield, waited two hours, and took train to Richmond, where I found a vehicle waiting for me. The college is only a short distance from the station, and from the road fails to impress one with its importance. The land appears poor, with sedges and poor innutritious herbage, subject apparently to being flooded, or partly flooded, in wet weather. But when the college is reached a surprising change of opinion is experienced. The buildings are almost all of wood, and are quite extensive, as well as commodious. The Principal has a fine large separate house, with a nice garden, and the officers and students occupy a large quadrangle. In addition to the Principal there are the following officers:—Matron, Mrs. Richardson; Science Master, E. C. Wood; English Master, C. T. Musson; Orchardist, G. Waters; Experimentalist, P. G. Wicken; Dairy Instructor, C. R. Cassidy; Farm Foreman, G. Cobb; Carpenter Foreman, A. Brook; Poultry Farmer, J. J. McHugh, and a few minor officers.

There are 100 students here, and the resources are strained to accommodate them, but still the applications for admission come along. The dormitories are very comfortable, and sanitary provision is complete. Deep drains convey all sewage to a distance, where it is utilised in a large irrigated vegetable garden, next adjacent to an extensive orchard and vineyard. Water is laid all over the place, and bathrooms are available for all. The electric light is provided not only in all rooms, but also in prominent places, so that the whole place is lighted till about 10 o'clock p.m. Next morning at 5.30 the light is again provided, and the clangour of a large bell awakens those students whose turn it is to feed and water the stock. At 6 a.m. all the others must turn out and commence work.

After inspecting lecture-rooms, museum, seedrooms, dormitories, carpentry, smithy, and several other interesting places, Mr. Thompson showed me over the dairy, which is the most complete I have yet seen. In addition to the usual machinery, implements, &c., and refrigerator rooms, there exists all the appliances for Pasteurising, or sterilising, milk and cream, and for the making and use of the "levures," or ferments, which are said to be regularly employed in the Danish factories.

In the machinery and implement sheds, as well as at work on the farm, were many forms of implements not common elsewhere. A machine for reaping and binding maize crops, made by McCormick and costing £40, will do the work of ten men. Last season one of these machines cut 100 acres of maize 15ft. in height without any trouble. Another valuable machine is the maize-chaffer, made by the "Silver Machine Company," Iowa, U.S.A., which will chaff a ton of green maize within two minutes. There is a turnip singler, made by Thompson & McLean, Dumferline, Scotland, which after three days' trial took the Highland Society's gold medal. Then there is a machine which chops the standing maize stems after the corn has been harvested, making very short pieces which are easily ploughed under. This practice would be extremely wasteful in South Australia, and I think also in any other country. There are, of course, many other implements worthy of note, including the digging ploughs, which are greatly appreciated at the Hawkesbury Farm.

In the experimental part of this farm there is very much that is valuable and interesting being carried on, as there should be where funds are so liberally provided, and where special officers are appointed to carry them out.

The work appears to be done faithfully and with great intelligence. Two important experiments at once attracted my attention. The first was that Marram grass is growing well upon sandy soil here, thirty-eight miles from the coast, and this is a long way distant from the influence of the sea breezes. The grass was cut three or four times during the season. Of course the good rainfall of the locality may have had some influence. Then some plots of lucern struck my attention. These were growing side by side, and whilst some were extremely luxuriant, close, and large-leaved, others were stunted, sickly, and gappy in the rows. There were five lots of seed sown side by side in soil of one character, at the same time, and with exactly the same treatment. Seed obtained from Singleton and Tamworth, in New South Wales, gave the best results. Tamworth seed gave six times more dry hay per acre than was obtained from plants raised from Hungarian seed. In the first two years seed from America gave best results, Tamworth closely following. English seed came next, then Singleton, and lastly Hungarian—a long way behind. As the plants became older the Tamworth and Singleton crops got ahead.

Some experiments with maize have borne out the conclusions arrived at in America: that frequent shallow cultivation during growth greatly increases the product. Some maize left uncultivated gave 30 bush. of corn per acre, whilst a crop cultivated six times gave 65 bush., or equal to 5 bush. for each cultivation.

Of water melons, 270 tons were grown last season, and Mr. Thompson says this is a long way more profitable crop than potatoes at £5 per ton. Great quantities of pumpkins and similar fruits are also grown.

I was also taken around the district to see several farms and orchards. There is a lot of good country about here, and many hundreds of acres of orange and other fruit trees. Not a few of the orangeries appear to be neglected and diseased, but there is a much better state of things on the whole than I had been led to believe. On the Curradjong there are hundreds of acres of young oranges looking vigorous and healthy, but nowhere in New South Wales did I see such beautiful growth as I afterwards saw in Queensland.

On morning of Friday, June 11, I went back to Strathfield; thence to Paramatta, where Mr. George Quinn, our Inspector of Fruit, joined me, and later on Mr. James Purser, of Castle Hill, came with a vehicle and took us on to his place, seven miles distant.

Arrived at Mr. Purser's, we had half a day's inspection of orchards and orangeries in the Paramatta district, and next day we had a much more extended investigation. There is a very large area under oranges and lemons, and there is much less of disease and bad cultivation than I expected to see. Many of the orangeries are well-cultivated and clean, with scarcely a sign of scale or disease; and a few are badly neglected. The trees are not large, and most are small. We have in the Montacute district and elsewhere larger trees than any seen in New South Wales. The smaller gardens, where well attended to, are very profitable; but there are quite a number of sadly-neglected and diseased patches in places outside the large centres of orange-growing. In regard to other fruit trees, they are not generally creditable to their owners, except, of course, in some instances. Date plums are a special feature in New South Wales, where a good number of varieties are grown, and several of these are very desirable for cultivation in South Australia. Passion fruits are grown largely also, and these are often grown on tall trellises, just as we sometimes grow grape vines. It is not necessary to further remark upon fruit culture, except to say that it is to be hoped that education by the travelling lecturers will make improvement in every direction.

On Sunday, June 13, we went back to Strathfield and stopped at Thorpe's Family Hotel, close to the station, so as to have a longer time in the morning



for catching the northward train. On Monday, June 14, started by 9-13 train for Brisbane. By taking the morning mail trains we were enabled to see the country. We passed along the Hawkesbury for several miles, through long tunnels, rocky gorges, deep ravines, thick forest growth, with precipitous cliffs occasionally, often close down to the water's edge, or even crossing bays and indentations along its wide course. When we got away from this beautiful river we passed through grand forest country, and between Cockle Creek and Newcastle saw great numbers of Queensland Lily (*Doryanthes Palmerii*), with flower-stems 6ft. to 8ft. high, besides numerous other plants which would be of great value in nurserymen's collections. At Newcastle we stopped half an hour. It is rather too near high-water mark, and the neighborhood is not very inviting, though the town is large and contains several fine buildings.

At 9-30 p.m. we arrived at Tamworth, and stopped for the express, which should have passed here at about 3-30, but was an hour late. It was bitter cold waiting nearly two hours on the platform, and we were glad to get into the carriage, even though the footwarmers had been lying on the platform for more than an hour.

Tuesday, June 15.—Breakfast at Glen Innes, a very rocky place, nearly 5,000ft. above sea level, with small patches of apparently good soil along the valleys, where potatoes, maize, and roots are grown. About midday we arrived at "Jennings," which becomes "Wallangarra" by walking across a narrow platform into Queensland territory. Here the delegates obtained their Queensland railway passes. The stationmaster was extra particular in identifying the delegates, and it occupied more than half an hour to get this business through—consequently no time for midday refreshment.

At Toowoomba, as it was just dark, we left the train and put up at the Royal Hotel—a very nice place indeed—as it was not worth while getting down to Brisbane about midnight.

On Wednesday, June 16, left after breakfast for Brisbane by mail train. For many miles the line runs down a mountain range, with rocky gorges, deep gullies, long tunnels, dense forest scenery, ferns, palms, and most beautiful views. Sharp curves are numerous, and there are many steep inclines. Then we came on to comparatively level country, with numerous farms, where maize, potatoes, and lucern seem to be standard crops; and then some more descents through mountain country brought us down to Brisbane.

I had previously received a letter from Mr. Leslie G. Corrie, in answer to one of mine, and in this he recommended delegates to put up at the Union Club, Charlotte-street, a very large and comfortable private boarding-house kept by Mrs. Boccock. Consequently the great majority of delegates took up their quarters there, and we found it very convenient for holding our special committee meetings.

We were not long in getting to work, as we at once were met by Mr. A. H. Benson and a number of other officials connected with the Department of Agriculture, as well as by Mr. Leslie G. Corrie, President of the Queensland Economic Fruitgrowers' Association, and several others. Went to Exhibition Building to see where Conference meets, inspect locality where horticultural exhibits were to be staged, &c. I was surprised to see so many boys and girls running about with no shoes or stockings. Many females wear extraordinarily large funnel-shaped black straw hats. The townspeople said the weather was cool and pleasant, but the southern visitors found it very sultry, and some of them purchased lighter underwear.

On Thursday, June 17, Messrs. Quinn and Pulleine kindly unpacked and staged exhibits with aid from other South Australian delegates.

Friday, June 18.—Conference opened in concert hall by Hon. A. J. Thynne, Minister of Agriculture. Mr. Leslie G. Corrie elected chairman, and a lot of

preliminary business arranged. Committees appointed. Judges for show elected. Three papers were read and discussed. After luncheon a short session of two hours was held, and meeting adjourned on account of concert. In the evening another session was held.

Having heard it stated that it was intended to adjourn until Wednesday, June 23, on account of the Queen's Jubilee celebrations, delegates protested, and it was decided to hold two sessions on Monday, but devote Saturday to attending our exhibits at the show, giving information to visitors, and protecting exhibits if necessary.

Saturday, June 19.—Early morning was devoted to visiting the Botanic Garden, which is very interesting on account of its numerous clumps of giant bamboos, various large palm trees, luxuriant growth of semi-tropical plants and trees which cannot be grown in the more southerly colonies. Drizzling rain was falling all the time. Winter, even in Queensland, is not the best time to criticise a garden, but, on the whole, I do not think this one can favorably compare with that of Adelaide, but I presume the expenditure is much less on the Brisbane gardens. The rest of the day was spent at the exhibition attending to visitors at the fruit show. In the evening the Economic Fruit-growers' Association gave a "smoke social" to the visiting delegates, which was reported to have been exceedingly pleasant.

Monday, June 21.—As the concert hall was engaged for a big rehearsal the delegates endeavored to conduct business in the picture gallery, but much noise and distraction was caused by the travelling public. Arrangements were consequently made for conducting business in a large room in Eagle-street, where afternoon and evening sessions were conducted, and also on Wednesday, Thursday, and Friday, June 23, 24, and 25.

The evening of Wednesday, June 23, should have been devoted to a lecture by Mr. J. E. Pound, Queensland Bacteriologist, which had been specially arranged by the Royal Society for the delegates, but by some mischance we were not aware of this fact, and therefore only a few delegates attended. The rest attended the conference meeting. Friday evening was devoted to a lantern lecture upon "Economic Entomology," by Mr. Charles French, F.L.S.

Tuesday, June 22, was devoted to celebrating Her Most Gracious Majesty Queen Victoria's Diamond Jubilee. There was a feast provided for thousands of children, a grand review of volunteers, opening of an expensive bridge over Brisbane river, introduction of an electric tramway just completed, fireworks at night, and many other public functions, all of which were most successfully conducted.

Several delegates, including Mr. Quinn and myself, visited Nudgee, where we saw pineapples growing by the acre, also bananas and several tropical fruits. At Mr. Atthow's there were several acres of bananas and pines, and the latter were liberally sampled by the visitors, who greatly appreciated them. Next we went to Mr. Child's orchard and vineyard. Here some of the Queensland wine was sampled in large tumblers, but the contents were very slightly diminished in any case—perhaps because we had all been eating juicy pineapples just before. Here we saw trees of custard apple, guava, jack fruit, papaw, also bananas, pineapple, and a great many other kinds which were strange to most of us. Lastly we went to Messrs. Wagner's place, where there was a long table laid out with several varieties of pineapple, which were vigorously attacked by all hands. Those who have tasted only the pineapples which arrive by ship in the southern colonies can have no idea of the luscious flavor and juiciness of the same fruit when properly ripened on the plant. The soil on which pineapples are grown is a deep red sand, with a certain amount of clay intermixed. The plants grow about 3ft. high in rows closely together, about 10ft. apart, on ridges, and horse manure

is thickly applied amongst the plants. They are constantly cultivated, and about every four or five years are dug up, and suckers or crowns planted in fresh localities.

Friday, June 25.—I could attend only at the morning session of Conference. The whole afternoon was occupied until dusk in arranging for distribution of dried fruit exhibits, securing samples of seeds, &c., from other exhibitors, and packing up, and evening was occupied by a special committee meeting. One box of Thomas Hardy's currants and one box of T. B. Robson's table muscatels were presented to Lady Leamington, who was afterwards pleased to express her appreciation of their good quality. Other boxes were placed in care of Mr. H. Benson, Fruit Expert to the Department of Agriculture, Queensland, who kindly undertook to place samples with those who are most likely to require later on to purchase. The Waverley Vinegar Works' olive oil attracted a deal of notice, and many inquiries were made with a view to purchase. The Stoneyfell olive oil received first award, but there was only a small quantity, and, being placed closely beside the larger exhibit, was generally thought to belong to it, notwithstanding prominent cards affixed to each exhibit.

Saturday, June 26, was the most enjoyable day spent in Queensland. The Minister of Agriculture (Hon. A. J. Thynne) invited all delegates to accompany him on a trip by Government steamer *Offet* to Redlands Bay, a long distance down the Brisbane river. There was a pleasant breeze, which cooled us all and dried our clothing. At Redlands Bay there is a very large place that was built to serve as an hotel. Away at the back are several gardens where the people grow bananas, pineapples, and many of the tropical fruits before-mentioned. They used to grow a little sugar-cane here, but clearing off the forest, I understood, made the climate rather unsuitable for it. We were driven around by settlers of the district, who were very kind, and had left all gates opened so that we could get about without trouble. Here, as well as in most of the gardens in Queensland, orange trees find congenial conditions and make great growth. Mandarins of several varieties are plentiful; but I do not refer more fully to fruit and fruit pests, which are very numerous, because Mr. Quinn proposes to deal with them in his report. In several places coffee trees were covered with their bright red berries, and there appeared to be heavy crops. We saw a few sugar-canes growing, but there was nothing like the large luxuriant growths that were brought down from about 300 miles further north. There is really nothing like tropical growth in the neighborhood of Brisbane. We saw much denser forests and more tropical-looking growth within a few miles of Sydney than we found about Brisbane. The soil around Redlands Bay was the best seen since leaving South Australia—a rich, very red, good loam. After about three hours ashore we returned aboard, and started back. Of course there were three or four nice meals, made all the more pleasant by the absence of long speeches. Three or four toasts were given, including "The Queen," with the National Anthem added, but the longest speech did not occupy five minutes.

A session of Conference was held on board to finish up several matters; and perhaps the most important item of the whole Conference was the re-establishment of the Federated Fruitgrowers' Association. A gentleman of Sydney promised a donation of £50 towards it, and all the delegates gave in their names and paid in their subscriptions. A most energetic and successful organiser was at once appointed general hon. secretary, and several patrons, presidents, treasurers, hon. secretaries, &c., were nominated for each colony. It is intended at the earliest opportunity to establish a monthly journal in connection with the organisation, and there now appears to be every probability that it will prove highly successful.

Several of the delegates tasted all sorts of strange fruits this day, including jack fruit, "pawpaw," and granadilla, with the result that they were much disturbed during the hours that ought to have been devoted to peaceful slumber.

This day finished the work of the Conference, but, as we had all been disappointed in not seeing any real tropical forest, the officers of the Queensland Agricultural Department arranged for a trip to Woombye on Monday, and we waited another day for this.

On Sunday, June 27, a few of us visited the Acclimatisation Society's garden, under the able care of Mr. Souttar. Want of funds has been the cause of much neglect, but there are many very fine palms and other trees here, besides a great number of valuable and useful shrubs and trees.

On Monday, June 28, we went northwards, about sixty miles, to Woombye, where there is a small area cultivated with sugar-cane, which is manufactured in the locality. We did not see the sugar mills, but we did see some cane, also more bananas and pineapples. At Mr. Davey's place we saw a great number of the latter piled up ready to send to market. They were all very large, ranging from 7lbs. to 9lbs., and he sliced up several for us--indeed, he wanted to load us up with them. Two or three of these large pineapples were brought over to Adelaide, and arrived in perfectly good condition.

Throughout Queensland the stranger notices that the houses are mostly built of wood, and are upon short piles or posts, upon the top of which is a large inverted tin dish. The piles are "white ant" proof, and the dishes are intended to prevent these insects getting at the woodwork of the houses built above them. Ant hills 5ft. or 6ft. high are abundant in places, and at heights up to 20ft. on the trunks of many trees are masses of earth as big as a flour cask, which cover the work of these destructive pests. There are advantages connected with these wooden houses. They cool quickly--if a cool change occurs--and they are above the wet soil when it rains. The pigs, dogs, and fowls can sleep beneath the rooms, and it is easy to tell at night when anyone is moving about in the other rooms.

On Tuesday, June 29, Mr. Quinn and I started for Sydney, a journey of twenty-eight hours.

Wednesday, June 30, arrived in Sydney.

Thursday, July 1.—As we could not start for Melbourne until 7:15 p.m., accepted an invitation from Mr. H. Sparks to visit the National Park, seventeen miles north-west from Sydney. This comprises some 36,000 acres of land covered with its original natural forest and vegetation, much of it very poor soil, but along the Hocking river, which runs through it, the scenery is really grand and beautiful. A dam has been thrown across the river, and on the lower part the tide rises and falls. There was a small Government steamer at our service, which took us down a long distance to near Botany Bay, and within sight of the ocean. Every turn disclosed some new and beautiful view, and at one place there were several handsome country residences, built upon a spot which had been alienated many years before the National Park was set apart.

Returning to the weir, we noted that the tide had receded a lot, and the rocks everywhere were covered with rock oysters. We then took a rowing-boat and proceeded up the freshwater part of the river, beneath towering trees which obscured the light in places with thick masses of palms, fern trees, shrubs, bushes, climbers, fig trees, and a most luxuriant and tropical vegetation. Wild fowl swam about close by, scarcely noticing us. Amongst the forest and ferns on the banks and hills we could hear the lyre-birds imitating all the sounds of the bush, and so closely was the mimicry executed that we could not tell with certainty which was the real and which the imitation. The Queensland Lily

(*Doryanthes Palmerii*) is abundant here, and many were just about flowering. The stems are 4in. diameter, and about 6ft. to 8ft. high. Heavy fines are inflicted on visitors who destroy these flowers or interfere with the ferns.

All things must have an end, and our trip practically finished here, as we took train for Melbourne at 7.15 p.m., and next day arrived in Melbourne. On Friday morning saw several officers, obtained specimens of various insects, &c., took train in the afternoon for Adelaide, and got there next day, Saturday, July 3.

Throughout the whole time we were away from Adelaide we received the most considerate treatment from everyone. The Victorian officials granted a three months' first-class ticket over all lines to delegates from other colonies than Victoria. New South Wales provided sleeping-car accommodation from Jennings to Sydney, besides granting railway passes to any place required. Queensland provided free passes over all lines for three months if required, and gave many other evidences of their good will; and the officers in the Departments of Agriculture in each and all of the colonies laid themselves out at all times and in every way to make the visit of the delegates as pleasant and as profitable as possible.

### FARM PRODUCE MARKET.

Messrs. A. W. Sandford & Co report:—

July 30, 1897.

The favorable weather experienced during this month has materially improved the appearances of crops and pasture over all the agricultural districts, but more rain is certainly wanted to give the subsoil that thorough soaking required to face the warmer weather which will soon be in evidence, and it is yet premature to state that the severe drought has really broken up. The young wheat plant is coming along well, especially in the earlier warm districts, and growing feed becoming abundant. In breadstuffs the market is exceedingly quiet, milling operations being confined to local requirements, and the export market for flour is entirely controlled by Sydney rates, that port now receiving the full benefit of importations from America. A number of small parcels of South Australian wheat are selling at 5s., quite sufficient to keep going the few mills that are not shut down. Offers of considerable parcels of Riverina have also been made, but the price demanded is higher than buyers care to give. Demand for flour has been very slack, and although the Associated Mills are still asking £13, several country brands offer at less money. The offal market is extremely dull, growing feed taking the place of bran and pollard; values, however, are unaltered, 1s. 3d. being demanded for both the lines mentioned. Feeding grains and forage lines are not plentiful but demand has also slackened off.

Oats.—White, 3s. 8d.; dun, 3s.

Chaff—£5 15s. to £5 17s. 6d. per 2,000lbs., bags extra.

The importation of a few small lines of Victorian and Tasmanian potatoes caused holders in the south-eastern districts to lower their ideas of price, so that this market is again chiefly supplied from Mount Gambier and neighborhood. Values are—Gambiers, £4 to £4 2s. 6d.; Ballarats, £1 5s. to £1 7s. 6d.—at Adelaide and Port Adelaide.

Onions.—Supplies mostly coming from the settlements, £8 to £8 10s. for prime samples, with firming tendency.

The effects of the late drought on dairy products have not been confined to this colony alone, Victoria at the moment being so short of supplies that she is compelled to purchase butter in Sydney and New Zealand to fill her local wants, with the result that values in most lines throughout Australasia are higher than they have been for very many years past. For some time this market has also had to depend upon imported butter for three-fourths of our wants, and, notwithstanding the improvement in the pastures, it will be several weeks before we can hope to become self-supplying. Those interested in our dairying industry are only now coming to realise the enormous losses which have taken place in the herds, and the difficulty of re-stocking renders it probable that the disastrous time just experienced will very adversely affect the exportation of dairy produce for a year or two at least. Butter in prints sells at from 1s. 3½d. to 1s. 7½d., for collectors' to prime factory lines. In eggs prices rule considerably above rates usual for time of year, the strong demand from Western Australia bringing about this result. Values have, however, eased during the month, and at the present moment eggs are selling in Adelaide at 1s. 3½d. per dozen. Bacon is also high, and unfortunately the raw material in this line is very short of trade requirements, so that heavy importations of pigs are being made from Melbourne and Sydney. The market has till now been supplied by locally-made cheese, but some imported will be required to meet the demand until new season's make

can be got ready. Honey is cheap compared with other lines, buyers readily securing their requirements at 2½d. to 2¾d. Carcass pork and veal have been very scarce, the former selling at 5½d. to 6½d. for good shop porkers; baconers, 4½d. to 5½d.; vealers, 2½d. to 3d. The demand for poultry, on account of the presence of Western Australian buyers, has for past twelve months been considerably in excess of supply, and this is a direction to which our producers should give their attention, as the market, with improving facilities for export, must become more important. Fowls sell from 1s. 2d. for poor hens to 1s. 8d. for choice roosters; fine heavy table birds worth up to 2s. 6d. Ducks also very salable at from 2s. 2d. to 3s. Geese, being out of season, have been somewhat neglected, values ruling from 2s. 6d. to 3s. 3d.; pigeons vary from 4½d. to 7d.; turkeys in very active demand at from 5½d. to 6½d. per lb (live weight), for fair to good birds.

## WEATHER AND CROP REPORTS.

**APFILA-YARROWIE.**—The weather during the last month has been very favorable, good rains having fallen each week. There have been no frosts, and with warm days the wheat is coming on splendidly; 2·855in. of rain has fallen during past month.

**BARROOTA WHIM.**—Since the break up of the drought the weather has been all that could be desired. During past month nearly 4in of rain have fallen, and the prospects of the season have greatly improved.

**BORDERTOWN.**—Owing to the scarcity of food cattle are still dying in numbers, and it is estimated that 300 have already died in this district, some farmers having lost all their dairy stock. The rain during past few weeks has been all that could be desired for crops and grass. With heavy rains and cold nights the mortality with stock would have been much greater. Very few lambs will be shorn here this season.

**CAJICA.**—The weather during the past month has been very favorable to the growth of the crops and grass. The rainfall has totalled about 4in.

**CLARE.**—Of late splendid rains have fallen, with intervals of good growing weather. The absence of severe frosts has changed the prospects, and the outlook is very favorable. During past three weeks 3·670in. of rain have fallen. A considerable area of wheat has been put in with the drill, and but for the fact that it was late before sufficient rain fell to soak the land, a larger area would have been put in. These crops look very promising.

**COLTON.**—The weather has been very favorable to the growth of vegetation since the rains in the middle of June, but owing to the perennial grasses, including the spear grass, having been killed either by rabbits or by the drought, there is very little feed yet. Generally with the first rains these start at once from the roots, but this season new plants from seed will have to be depended on. Stock of all kinds have suffered terribly. There will be very few lambs, and many of the big sheep have succumbed. The rabbits have also suffered terribly in the outside country and very few are to be seen, except on a few farms where there was a little grass left for them to live upon.

**GAWLER RIVER.**—The late spring weather and absence of severe frost has brought on the crops and grass. The wheat has generally come up well, and is looking strong and healthy. The late-sown crops are well above ground, and pretty free from weeds. The area under crop is about the same as last year. Those who have hay left are pushing on with fallowing. There has been considerable loss in cattle and horses, the former principally, through absence of nutritious food, and the latter from sand. Pruning and cultivation in the orchard is the order of the day. The orange trees promise a fairly good crop of clean fruit. Rainfall for six months ending June 30th, 5·100in.

**LUCINDALE.**—We are now experiencing fine growing weather, nice rains, warm days, and no frost. For July (to 21st) 2·080in. have been recorded. A large quantity of commercial fertilisers are being used this season, and the benefit arising from same is already noticeable. A very fine lambing season is probable, although foxes are playing havoc in some flocks. This pest threatens to become a serious one in the near future. About thirty foxes have been killed here during past month. Stock on the whole are in good condition, and a fair number of sheep are being sent to market. In the orchard pruning is about finished. Extensive additions are being made by some growers.

**MAITLAND.**—Up to date the month has been everything that could be desired. The ground has been well soaked, and the majority of dams filled. To July 20th about 3in. of rain have been recorded, and the crops are looking well, though many paddocks are very dirty. This is due to the lateness of the rain. Stock are in very poor condition, many farmers having lost heavily. Horses have suffered severely, while the sheep are almost skeletons, many farmers having also had to kill the lambs as soon as dropped to save the ewes.

**MOUNT PLEASANT.**—The crops in this district are generally looking well, but a large area was put in late. The very early sown crops do not look so well as the April and May sowings. Stock are in very low condition, and scores of dairy cows have died and are dying, losses which could have been prevented had landowners stored some food for them.

**NANTAWARRA.**—Rainfall for June, 3·250in. The weather during the past week has been very favorable, about 1½in. of rain having fallen throughout the district. Crops and feed, which have been checked by frosty nights, should now make good progress. The crops put in with the drill, with manures, have come up more evenly and are much stronger than the broadcasted crops. Stock are in very poor condition.

**PINE FOREST.**—Splendid rains have fallen, and although the crops are backward there has been a noticeable improvement recently. The manured crops are in advance of the others, and where new land has been put under crop these are more forward still. Most stock are in poor condition, and numbers of horses are dying from starvation and sand. The rainfall for the first six months of year was less than 4½in.

**PORT BROUGHTON.**—Stock are in very low condition, and many are suffering from sand. The splendid rain has resulted in good growth of crops and feed. The heavy losses of stock have impressed on farmers the necessity for conserving all the fodder possible for seasons of scarcity.

**PORT GERMEIN.**—The prospects for the season are very encouraging. Since the break up of the drought in the first week of June the weather has been all that could be desired.

**PYAR.**—The rainfall for June amounted to 0·992in., the best fall for over eighteen months. The crops are looking as well as can be expected, and feed is now coming on well. There has been less wind than usual at this time of the year.

**RIVERTON.**—Splendid rains have fallen during June and July, and, with mild warm days between, the crops have come on well, and are looking healthy and clean. A large area has been put in with the drill. Rainfall: For June 1·270in.; July, to date, 1·485in.

**SADDLEWORTH.**—Up to June the rainfall was very little more than half the average, but since then we have had good rains and splendid growing weather. The crops, though backward, are making good growth, and look healthy. The rain of May 24, being the earliest sufficient to cause the seed to germinate, the wild oats have come up strong in the wheat crops, especially on the black ground. The so called Cape Weed or dandelion is thick on the sandy flats along the Gilbert. The prospects for the hay crop are fairly good. Purple Straw wheat is the general favorite, while White Tuscan has been in greater demand than usual. A considerable area of fallow land has been put in with the drill, and already the wheat here shows much stronger than where broadcasted. Fallowing is now general, the land working up well. Many losses have occurred amongst cattle and lambing ewes, and sheoak and peppermint branches have been used extensively to keep the animals alive. Rainfall for six months, 4·700in., against an average for seventeen years of 8·667in. For July (to 20th) over 2in. have been recorded.

**YANKAILLA.**—We have had splendid rains during the past month. A larger area is being cropped this year, and prospects so far are good. On several farms the seed has been put in with the drill, and the result of this new departure for this district is being watched with much interest.

## PEACH APHIS.

Mr. F. Russell, of Paralowie, Salisbury, has been perfectly successful in destroying aphides on branches of peach trees by spraying them with a solution of sulphate of potash. He dissolves ½oz. of the sulphate of potash in 3galls. of water, adding a very little kerosine emulsion to make it adhere, and then applies it by aid of a spray pump. The sulphate of potash is also a good fertiliser.

## IMPROPER USE OF KAINIT.

The Chairman of the Agricultural Bureau (Mr. F. Krichauff) writes that several farmers who received parcels of kainit for experimental purposes have disregarded the positive instructions that this fertiliser must not be applied as a top dressing, nor at the same time with the sowing of the seed. He strongly reiterates the caution that kainit must only be applied some time before the sowing or planting of any crop. If sown with grain, kainit is very liable to seriously interfere with its germination. Where salt exists in the soil, as is the case, for instance, in places on Yorke's Peninsula, kainit may act injuriously. If potash is needed in such places it would be well to use muriate of potash or sulphate of potash.

## PACKING ORANGES FOR EXPORT.

By GEORGE QUINN.

Where success has been achieved in exporting oranges to Europe, the fruit has been cut in dry weather, when fully matured and colored; they must be ripe, otherwise the sweetness will be deficient, but not over-ripe. They should be cut through the stalk as close as possible to the fruit without injury, and to save time and handling I would suggest that the fruits be graded from the trees. After being cut they should be placed in open trays or boxes and exposed in an open shed to the air for about a week. This gives time for surplus moisture to evaporate from the rind, allowing it to toughen.

The fruits should be quite clean of sooty fungus and scale insects, free from blemishes caused by rubbing when on the trees, bruises, or thorn pricks, and should have thin and smooth skins, giving a firm resistance to hand pressure. The sizes should be graded from 2½ in. to 4 in. in diameter. Each case must be filled with fruit as nearly alike in size, color, quality, and variety. The fruits should be each wrapped in tissue paper—white shows the fruit to best advantage—and packed in rows as evenly as possible; if spaces occur at the ends fill them firmly with soft paper shavings, as shown in Fig 1. Never use smaller

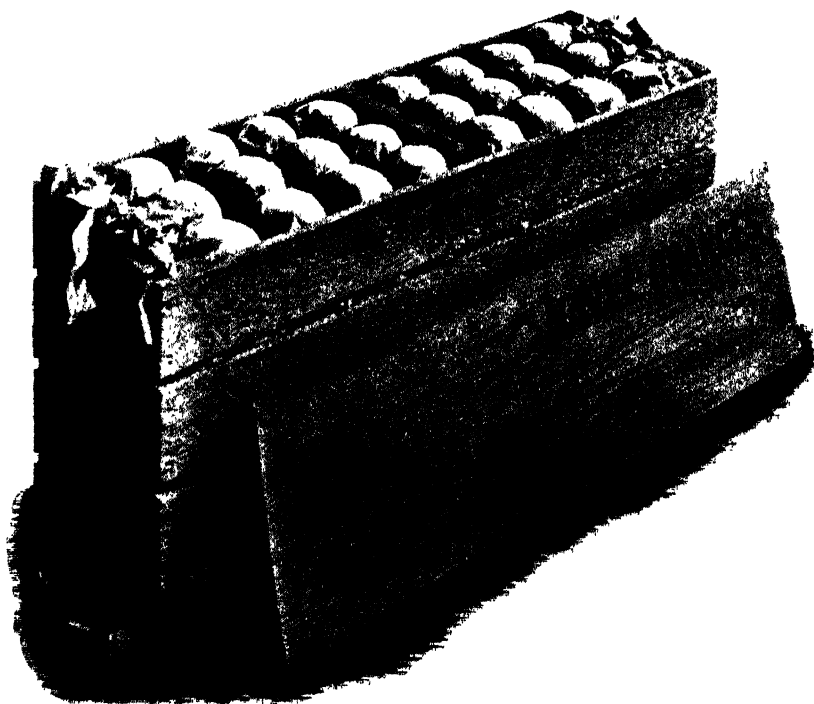


FIG. 1.—CASE OF ORANGES PROPERLY PACKED.

fruits for this purpose. Continue packing until the fruits project nearly an inch above the sides of the boxes; allow packed boxes to stand about half a day before nailing down the lids.

A little pressure used gently will not hurt them if properly wilted before packing.



The cases should be branded with the owner's name or initials, or device adopted by him, and the locality may be printed beneath.

The number and sort of orange contained in each case should be printed distinctly. The number of cases in the consignment and the grade may also be put on, but these are not of so much importance. However, all branding should be done neatly and distinctly, as follows:—

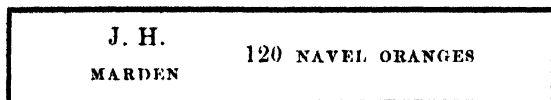


Fig. 2 shows the style of packing and branding which should be avoided, but unfortunately is a *fac simile* of some cases sent to London per R.M.S. *Australia*, on July 14, 1897. The fruits were very irregular in size, unevenly packed, and carelessly wrapped.

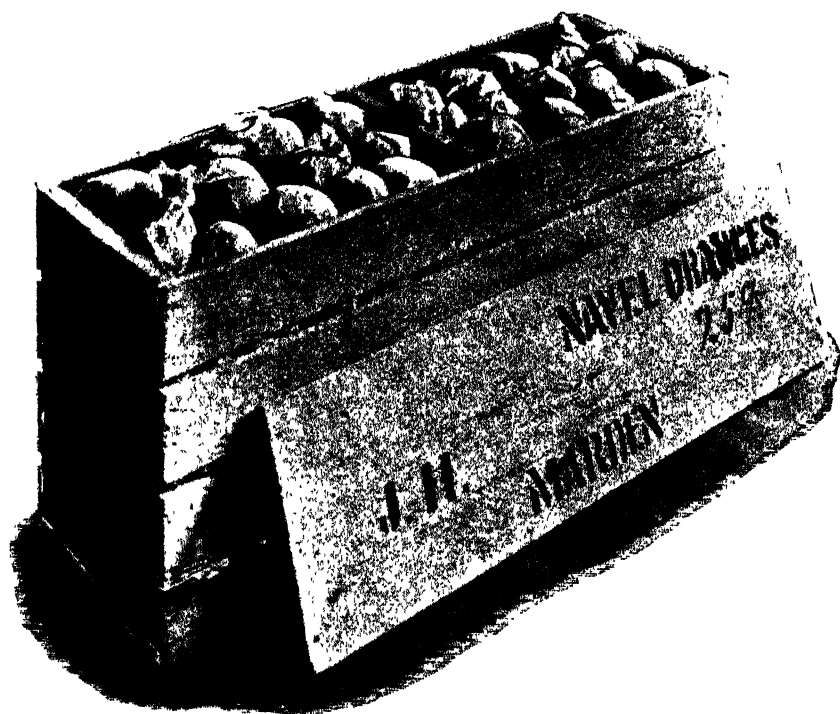


FIG. 2.—CASE OF ORANGES IMPROPERLY PACKED

### CHANGE OF FEED.

A sudden change from green grass, &c., to dry hay or similar food is likely to prove injurious to the animal subjected to such treatment. When green feed begins to get scarce a little dry feed should be given, gradually increasing the supply as the succulent food becomes less plentiful. Where pit ensilage is provided in plenty there need never be any fear of the cows falling off in their supply of rich milk, even if there should be no natural herbage in the paddocks.

## PHOTOGRAPHS ILLUSTRATIVE OF LOCAL INDUSTRIES.

Prizes of £5, £3, and £1 have been offered for best set of twelve photographs illustrative of producing industry. The competitive collections are to be sent in, addressed to the Agricultural Department, before the last day of October, enclosed in an envelope marked with a *nom de plume* in the left-hand bottom corner. The plates must be half-size or over, and may be illustrative of only one industry or of different industries, but must be illustrative of some industry of importance from an export point of view. If the result of this competition is satisfactory, further prizes will be offered later on, so as to cover the entire industrial year.

## ANSWERS TO CORRESPONDENTS.

LEMONS (W. R.)—1. No; orange stocks are bad. 2. Lisbon. 3. Young trees in soils like yours require no manure at first. 4. Would depend on size of tree. 5. Lemons may be transplanted with care from September till April, but September, October, and November are the most suitable months.

## CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, JULY 7, 1897.

Present—Messrs. F. E. H. W. Krichauff (Chairman), S. Goode, W. C. Grasby, W. F. Snow, and A. Molineux (Secretary).

### Sale of Commercial Fertilisers.

In reference to resolution passed at previous meeting, asking that regulations should be framed making it compulsory to sellers of manures to give a guaranteed analysis with the same, the Minister of Agriculture pointed out that clause 1 of the Fertilisers Act, 1894, made it compulsory for sellers to do this, and he wished to know whether the Bureau was aware of any infringement of this clause.

Members said they had every reason to believe that these fertilisers were generally sold without any analysis being furnished to the buyers. They believed, however, this was due to the fact that the sellers were not aware that clause 1 made such action compulsory, being misled by the regulations, which only gave the buyer power to have an analysis made under certain conditions. It was decided to call the attention of the Minister to this fact, and to ask that clause 1 of the Act should be published for the information of the public.

### Congress.

It was decided to hold the Ninth Annual Congress of the Agricultural Bureau on Wednesday and Thursday, September 8 and 9 respectively.

Mr. M. Rankine, Chairman of the Strathalbyn Branch, wrote that, as decided at the Conference of Branches held at Strathalbyn in March last, he had written to the Railways Commissioner conveying resolution passed at the Conference requesting that the Chairman and Hon. Sec. of any Branch should be allowed to give a certificate to the effect that their members, when attending Conferences, &c., were travelling on Bureau business and entitled to a return railway ticket at single fare. The Railways Commissioner had replied that the request could not be granted, but that all such certificates *must* be signed by the General Secretary.

### Cultivation of Saltbush.

The CHAIRMAN thought an effort should be made to secure a quantity of seed of the best of our perennial saltbushes for trial by settlers in the drier settled districts.

The SECRETARY said he had been endeavoring to secure seed for a long time, but it was very difficult to find people willing to collect it. He had received a few small parcels, and had given sufficient seed for a trial to a number of farmers and others. At the Wagga Experimental Farm the saltbushes were doing splendidly. Mr. Goode called attention to the value of the so called Evening Primrose (*Oenothera humilis*) as a fodder plant on sandy land. It spread rapidly and was readily eaten by stock.

### Membership of Branches.

Mylor Branch desired to know whether they had power to make a by-law providing that at the end of each year a certain number of members should be balloted out in order to allow of the introduction of new blood.

Members were of opinion that members of Branches could not be struck off the roll except for non-attendance.

### Codlin Moth Regulations.

The SECRETARY reported that the regulations as recommended by the Bureau had been passed by the Executive Council and gazetted.

Mr. GRASBY called attention to report of discussion *re* codlin moth regulation at meeting held on June 2. He considered this report incorrect in respect to his attitude *re* compulsory spraying with Paris Green. The Secretary read from minutes of meeting of Codlin Moth Committee, which had been confirmed, and from Mr. Grasby's written dissent from the recommendation of this Committee, and contended that these bore out the correctness of the report of the June meeting.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agricultural Papers:—

129. *Spraying of Potatoes* is recommended with the weak spring solution of the new Bordeaux mixture. The leaves get thicker, contain more chlorophyll, transpiration increases (which means also a slight protection against drought), the plant grows a longer time, and produces more potatoes containing more starch.

130. *Potatoes for Cows*.—From a number of experiments lately made by different persons with the feeding of potatoes, either raw, or steamed, or boiled, it appears that neither the quantity nor the percentage of fat is affected if not more than 25lbs. of raw potatoes a day be given. Bran, hay, or chaffed oats or wheaten straw should be fed with the potatoes. The raw potatoes should be of good quality, neither bitter nor partially rotten. Cows are likely to miscarry if they receive the latter in a raw state. With larger quantities of raw, and in a less degree with steamed or boiled, potatoes the milk is likely to increase, but the live weight of the cows decreases, the milk has a disagreeable taste and smell, is not so fat, does not churn quickly, and the butter is hard and unpalatable. The cheese made in Emmenthal was unsalable on account of its bad taste after feeding the cows only with 20lbs. of raw potatoes a day. Boiled or steamed potatoes are good only for fattening cattle.

131. *Experiments with the Milk of Ninety-seven Friesian Cows*—that is, from the whole of seven different herds, old, young, good or poorer milkers, but calving about the same time—have been made near Emden by Mr. N. Wychgramm, at the request of the East Friesian Society for pedigree cattle. The brown kind was represented by sixteen cows, mostly young or with the first calf; the black and white by eighty-one. Towards the end of the period of lactation the percentage of fat, as usual, increased very much. In the dry milk very often 5 per cent. of fat was found, while the highest figures were 7.6 and 8.2 per cent. The transfer from stall feeding to the run improved quantity and quality of the milk. The brown cows gave from 1,851 to 3,629 kilogrammes (a kilogramme is nearly 2lbs.) of milk and from 2.450 to 3.268 per cent. of fat. The lowest and highest quantity of fat was 51.743 and 103.085 kilogrammes for the time of the experiment. [Apparently

for about ten months.—CH. AGL. B.] The black and white cows produced from 1,417 (from a cow that fell ill) to 5,259 kilogrammes of milk and 2.196 to 3.811 per cent. of fat, the lowest and highest being 46.492 and 188.483 kilogrammes of fat. The results proved again the necessity of selecting the offspring of the very best cows as regards quantity and quality, for it was observed that the two were mostly found in the same cows. This was shown more particularly in nineteen cases, where mothers and their daughters were amongst the herds tried. One cow, which had calved earlier, would have shown an average percentage of fat of 4.061.

132. *Our Cattle* are not a species, but the results of crosses of several species. At the Stone Age the bison (*Bos primigenus*) lived in Switzerland, for instance, with other species or varieties. One had short horns (*Bos brachyceros*), one round horns (*Bos trochoceros*), and one a very long forehead (*Bos longifrons*). Differing much more from the bison was *Bos frontosus*, with a large forehead, fossils of which were found in the moors of Scandinavia and Germany, together with *Bos longifrons*. At present cattle are divided into seven different kinds. 1. The Desert race, which is silver-grey to grey-brown, but never spotted. It is found in Asia, the Balkan, and South-Eastern Europe, has pretty long but strong legs, a long narrow head, neck without dewlap, long horns, and the fore-quarter is more developed than the hind-quarter. The bullocks are good for work and fattening, but the cows give but little, although rich milk. 2. The race of the Lowlands is at home in the marshes near the Baltic and German Ocean, but a variety on the dry lands of Schleswig-Holstein and Western Prussia. The head is generally long and narrow, the horns stand horizontal with the points inwards, the neck is nearly without dewlap, the fore-quarters less vigorous than the hind-quarter, the legs are long, the hair is fine and smooth, parti-colored, mostly black and white, but also brown and white and mouse-colored: on the dry lands, red. They are no good for draught, but splendid for milk and butter, also for beef, as they are easily fattened. Their cattle are divided in five groups—(a) Those in Holland, Belgium, Oldenburg, and East Friesland, (n) those of Schleswig-Holstein, while elsewhere a mixed one with English breeds. The stock is kept quite pure in Breitenburg and the Wilster Marsh, from where they are frequently exported, are brown and white, and have a great name. The red-brown variety, with darker extremities, on the dry lands are known as splendid milkers. Their breed is pure in Angeln, near the town of Schleswig, from which a large number is every year exported, (c) in West Prussia, (u) on the northern coast of France, and (x) on the eastern coast of England. 3. One-colored Mountain Cattle live in the Alps, Apennines, Pyrenees, Switzerland, Tyrol, are dark-brown to light-grey, and taken to be the shorthorned *Bos brachyceros*. While good for fattening, they give but medium milk and a somewhat low percentage of fat in it. Only the Algau breed of Bavaria, which is light-grey, and never exceeds in weight 900lbs., is known as good milkers, and so must be those bred about the cloister of Einsiedeln, in Switzerland, where cows frequently bring £50. Switzerland exports largely to Italy. 4. Parti-colored cattle from the valleys are counted to be of the *Bos frontosus* type, and found in North-Western Switzerland and in the Alpine valleys of Southern Germany. Having a broad forehead, they are good for work with the yoke fixed to the forehead. The milk is good, but contains but a medium quantity of fat. Bullocks fatten well and weigh up to 3,000lbs. Cows from Simmenthal have lately come to the front. 5. The land races of middle Germany and Austria are mostly red, red-brown, and red-yellow, and in consequence of the mixed breeding they show more similarity with the Lowlands breed next to these and with the Mountain Cattle next to them. 6. The English cattle have been chiefly improved in the last century for fattening. Milk was also of secondary importance, and for draught the cattle were seldom wanted. (a) Shorthorns or New Durhams in the eastern counties have short legs, handsome small head, deep neck, were much improved for milk through importations from Holland and Holstein by Collins Bros., about 1770, and later by others. They grow very quickly, fatten easily, and retain their milk production; bullocks go to 3,000lbs. The color is brown-red with white, or quite white, or reddish white; the horns are yellow, and the form of the body cannot be surpassed; (n) Herefords are losing ground through being superseded by Shorthorns; (c) Devons are deep red and the best oxen for work; (u) Sussex are long in arriving at maturity; (x) Ayrshire have small horns, long neck, fore-quarters light, are the most famous Scottish breed for milk; (r) Kerry are natives of Ireland and give good and rich milk, although small; (e) Jerseys, Guernseys, and Alderneys are good milkers, of which the first named are especially valued in the United States; (n) Polled cattle are chiefly in Scotland. Cows of the breeds Galloway, Aberdeen, and Angus are known to have reared twenty calves. They fatten well, but are not very good milkers. 7. The French.—In the Bretagne the type is that of the *Bos primigenus*, while those in the middle and southern parts of France are allied to the brown cattle of Switzerland, and are named the Charolais breed. These have been much improved by crossing with Durhams or Shorthorns, and Frenchmen think them now equal to the best English breeds.

133. *Dehorning of Calves*.—Mr. von Swinowski cuts the hair away of three or four days old calves, where the root of the horn can be felt, covers the eyes of the calf with a rag, and in intervals of a few seconds puts five to six drops of nitric acid on the root of the horn.

134. *Fungi in Eggs*.—Mr. Lucet, a veterinary of Courtenet, reports that the shell of the egg is not impenetrable against bacilli and other germs. A miller, who got only twenty little ducks from 100 eggs, opened the others and found where the airy space is a black spot emanating from a dark-green mould fungus (*Aspergillus fumigatus*). Lucet now made several experiments, and observed that if the material for the nest was unclean and half-rotten the eggs become liable to the inroad of the spores of the above fungus. Eggs, however, which were rubbed with the spores of the fungus and bedded upon dry wadding, although powdered with the spores, were not infected. It appears, therefore, that the spores do not grow and penetrate through the pores of the eggshell unless a fatty or moist substance is present.

135. *Lime and Superphosphate* ought not to be used at the same time. Lime should be applied not less than three weeks or a month before superphosphate is spread, so as to give the lime time to become incorporated and distributed through the soil after a ploughing and harrowing lengthways and crossways. The super-phosphate is then able to act even better than without the manuring with lime.

### Noxious Weed.

The Minister forwarded communication from the Mount Lofty Gardeners' Association asking that the plant *Genista canariensis*, commonly known as Canary Island Broom, should be declared a noxious weed. It was spreading rapidly over some of the most valuable land in the Hills and had already become a very serious nuisance and source of expense to landowners.

The SECRETARY reported that previous requests to have this plant declared a noxious weed had been received. As the plant was at present confined to a comparatively limited area it would cost much less to destroy it now than if left unchecked for several years. It was decided to recommend the Minister to comply with this request.

### Branch at Saddleworth.

A request for approval to formation of a Branch of the Bureau at Saddleworth was received.

Members regretted this could not be granted owing to being within six miles of an already established Branch.

### New Members.

The following gentleman was approved as a member of the undermentioned Branch:—

PENOLA.—Mr. Alexander Cameron.

### Reports by Branches.

The SECRETARY reported receipt, since previous meeting, of fifteen reports of Branch meetings.

### MONDAY, JULY 19.

Present—F. E. H. W. Krichauff (Chairman), Sir Samuel Davenport, Messrs. Samuel Goode, W. C. Grasby, M. Holtze, H. Kelly, A. W. Sandford, and A. Molineux (Secretary).

### Finance.

The Finance Committee reported that the expenditure on the contingencies vote for year 1896-7, amounted to £755 12s. 1d., leaving an unexpended balance of £4 7s 11d. Accounts to the amount of £35 15s. 5d. were passed for payment.

### Establishment of Fruit Boards.

The recommendation of the Codlin Moth Committee that the Government should be asked to initiate legislation providing for the establishment of local fruit boards was considered.

The SECRETARY said the Tanunda Branch was moving in the matter, and had sent circulars to all the Branches in fruit-growing districts, asking for the opinions of their members. Mr. Grasby said the Codlin Moth Act was administered in Tasmania by means of boards. Where the boards were energetic much good was done, but many of the boards took little trouble in the matter. The Chief Inspector had told him that he was opposed to the board system, as he was strongly of opinion that the Act could be better administered from the head office. Further discussion postponed.

The CHAIRMAN said he thought the Phylloxera Bill should have come before the Bureau. He noticed that there was some opposition to the proposal, but thought the Bureau generally would support the principles of the Bill.

### Donations and Exchanges.

The SECRETARY announced receipt of usual exchanges from Agricultural Departments and seeds of native fodder plants from Messrs. A. F. Noll, of Quorn, and M. Koch, of Mount Lyndhurst.

### Sale of Commercial Fertilisers.

Mr. SANDFORD called attention to the fact that, according to the definition of "manufactured fertiliser" given in the Fertilisers Act, guano was exempted. He considered this to be a great mistake, as it should be compulsory for dealers to sell guano according to analysis, as there was more probability of fraudulent dealing in this manure than in the other commercial fertilisers usually sold. It was decided to ask the Minister to take steps to have the Act amended to include guano as a manufactured fertiliser.

In view of the possibility that phosphates and potash deposits might be found underlying the salt lakes on Yorke's Peninsula and elsewhere, as is the case in Germany, it was resolved that the Minister be asked to obtain a report on the subject from the Government Geologist.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from foreign agronomical papers:—

136. *Flax*.—The average price of flax has gradually dropped since 1876 from £2 8s. to £1 15s. 6d., and such fall and the difference between the finest quality and the second and third quality is very considerable, the lowest price being £1 4s. Professor D. F. Wohltmann has therefore experimented at the Poppelsdorf Agricultural Academy with fertilisers to increase the crops. One of the experimental fields had previously been cultivated with cereals, another with clover, and a third was rich in nitrogen and lime, but poorer in phosphoric acid and potash. The result as regards the quantity harvested was that on the first field nitrate of soda ploughed in was much better than merely a top-dressing. Nitrate of soda, muriate of potash, and superphosphate gave as much as 80 against 44 where not manured, while merely muriate of potash with sulphate of ammonia gave a very good result, viz., 71. On a second field the manuring with muriate of potash alone showed about 88 to 57 where unmanured; and only where nitrate of soda, muriate of potash, and superphosphate were applied it increased the produce to 97. A third field produced a good crop without manure, which proved how important nitrogen and lime is, as it did not pay to use superphosphate, while nitrogen and potash in small quantities gave a better crop than the land which did not receive it. Between 1880 and 1893 no less than eight patents for the retting of flax were taken out, but of several

others since taken only Mr Baur's patent has evoked considerable interest. The flax in sheaves is put into iron pots with high temperature and in a vacuum; they are treated with very weak sulphuric acid, a weak solution of carbonate of soda, and warm water. The Minister of Agriculture in Prussia caused flax to be sown in Silosia, and of the crop one-third was handed to Mr. Councillor Strehl and Mr. Heisig, the teacher of the cultivation of flax at Poplau, for steeping in water, and the other two-thirds to Councillor of Commerce, Gruschwick, for trial with Baur's chemical treatment. Half of the latter was broken and twined with machines, the other treated by hand. Although the old process of steeping in water seemed, on the whole, preferable, the faults found with the flax treated by Baur's process were not observed by Director Saxtorius in other samples so treated, and for that reason further trials will be necessary. Dr. A. Hecker hopes that a special experimental station for flax be established, like the one in Frau-tenuau, in Bohemia. At all events, a number of flaxgrowers in Laubau have now decided to use Baur's process, and the Minister of Agriculture for Prussia has agreed to a subsidy of £3,000.

137. *The Committee on Manures* of the German Landwirtschafts' Society [which contains 11,085 members.—CH. AGI. B.] held a meeting on February 15, 1897, when Professor Dr. Stutzer addressed the exceedingly large attendance of farmers on his experiments how the cultivated plants (with the exception of the leguminosae) absorb the nitrogen in the form of saltpetre. The alteration into saltpetre must be an oxidation, not merely a chemical process. Very small bacteria assist, and for three years he had tried to find how these live, and under what circumstances the saltpetre is formed in the most advantageous manner for the manuring of the soil. Dr. Stutzer found that the procreators of the saltpetre act differently from other bacteria. They are so small that you can observe them only by means of the strongest microscope, and they originate out of a mould-fungus (*Schimmelpilz*) by means of a change of the outward form and shape. Arbitrarily he produced out of the mould the bacteria which create the saltpetre, and again he was able to obtain out of these bacteria the mould. He was unable to enter into particulars as to his experiments at that meeting, but he stated that these bacteria were apparently chiefly living upon oxygen. This they found in the saltpetre, and if you give the oxygen access to the bacteria they destroy the molecule of saltpetre, consume the oxygen, and free the nitrogen, so that it escapes into the air. From being the creator of nitre the bacteria have thus become the destroyer of it. Bacteriology in connection with the soil, the manure, tobacco, and milk should be more encouraged, and a motion was carried as to the necessity for experimental stations for that particular branch. In a late copy of a German agricultural paper I find that such an experimental station for bacteriology only shall be established, and that £75 have been granted for 1897 to continue the experiments commenced by the late Professor Hellriegel as to the potash required by the different cultivated plants.

138. *Manuring Fruit Trees*.—Professor Dr. Barth-Rufach read a paper before the Fruit Section of the German Agricultural Society at Berlin, and calculated that the average fruit tree required yearly for the square metre (equal to 10½ square feet) 10 grammes of nitrogen, 15 grammes of potash, 5 grammes of phosphoric acid, and 15 grammes of lime; a little less for trees growing from pips, and more for the stone fruit. He does not think it advisable to supply trees only with stable-dung, compost, or liquid manure, as it would require of the first 120lbs. per tree to give it sufficient potash, and there would be an excess of nitrogen. Again, the compost would have to be very rich in humus, or too little nitrogen would be in it, and in all cases not enough phosphoric acid. He advises, therefore, to add to a moderate quantity of stable dung, given now and then, 10 grammes of nitrogen, 10 grammes of potash, and 5 grammes of phosphoric acid in the form of commercial fertilisers per square metre, which, as regards potash and lime, must be increased in sandy soils, and especially for stone fruit. He gives phosphoric acid and lime in autumn in the form of Thomas's Phosphate, viz., 16 grammes of it per square metre. To supply the 10 grammes of potash per square metre he uses 20 grammes of muriate of potash, or purified double sulphate of potash, and for sand half as much more; for nitrogen, 250 grammes per square metre of oilcake meal, or 80 to 100 grammes per square metre of blood manure. To manure in spring you require quicker-acting fertilisers; 50 grammes of 20 per cent. superphosphate per square metre is necessary for phosphoric acid, 50 grammes of sulphate of ammonia for soils rich in lime, or the same quantity of nitrate of soda for any soil. Potash can be also supplied in spring the same as in autumn, but it is always better to give it in autumn. If applied in a dry state, Dr. Barth recommends to make a trench (away from the stem, in a line with the outside of the branches) of 1 metre in width, about 10in. deep, to mix the fertiliser with the soil so taken, and to put it into the trench. In a liquid state the following may be used very late in spring or in summer:—Fifteen grammes of potassium nitrate, 15 grammes of phosphatic potash, and 50 grammes of nitrate of soda in 16 to 20 litre (=28 to 33 pints) of water.

### **Queensland Fruit Fly.**

The Minister wished to be informed whether there was any danger of introducing the fruit fly with bananas and pineapples from Queensland.

The SECRETARY said he had never heard of the pest attacking these fruits, but had written to Queensland for information.

### **New Branches.**

The formation of a Branch at Norton's Summit was approved, with the following gentlemen as members:—Messrs. W. Merchant, J.P., J. Jennings, James Bishop, Charles Jennings, J. Bishop, sen., Thomas Playford, jun., John Playford, James Cowling, George Watkins, Alex. Smith, James Pellew, John Jennings, jun., and W. H. Osborne.

It was also decided to approve of the formation of a Branch at Forest Range if suitable gentlemen willing to act as members can be obtained.

### **Field Trial at Bute.**

The SECRETARY of the Northern Yorke's Peninsula Field Trial Society wrote that a field trial of seed drills would be held at Bute on Wednesday, August 11, and asked that some members of the Central Bureau should attend. The Chairman and Messrs. Goode and Kelly promised to attend if they could get away.

### **Beneficial Birds and Insects.**

Mr. W. C. Grasby, the Hon. Secretary of the Special Committee of the Royal Society, recently appointed to consider the best means to adopt for the dissemination of information on local predatory insects and insectivorous birds, wrote stating that the committee had decided to communicate with all organisations likely to be in sympathy with the objects of the Society, asking them to appoint representatives to accompany a joint deputation to the Government to request—  
“ 1 That adequate remuneration be paid to collaborators in the following subjects:—(a) Details of the insectivorous birds of South Australia, including descriptions, habits, food, scope of usefulness, &c.; (b) similar information respecting predatory insects and the nature of their economic benefits to mankind.  
2. That all materials so obtained be placed at the disposal of the Education Department as a basis for a series of lessons to be prepared, with all suitable illustrations. That the lessons so prepared be made an optional subject in the public schools, to rank as science lessons, and be considered of equal value with manual training, for the teaching of which the teacher will receive equal credit.”

Members were in favor of the objects of the committee, and the Chairman was appointed to attend the deputation.

### **New Members.**

The following gentlemen were approved as members of the undermentioned Branches:—(Clinton Centre, Mr. F. Roberts; Morgan, Mr. A. Dennis; Angaston, Messrs. J. E. Swan and E. Trescowthick; Lyrup, Mr. R. S. Cheek; Colton, Mr. J. L. Dinnison; Eudunda, Mr. E. T. Kunoth.

### **Reports by Branches.**

The SECRETARY reported receipt since previous meeting of twenty-nine reports of Branch meetings.



## REPORTS BY BRANCHES.

**Petersburg, June 12.**

Present—Messrs. R. Cochrane (in chair), A. Dowd, W. Waters, F. W. Sambell, and J. Wilson (Hon. Sec.).

BUSINESS.—A considerable amount of correspondence was read and discussed. Other business was postponed till next meeting.

**Clare, June 11.**

Present—Messrs. J. Christison (Chairman), W. Kelly, G. Lloyd, H. Miller, and W. Kimber (Hon. Sec.).

APPLES.—Mr. Kelly tabled an apple called Perfection; it was of fair size, showy, but wanting in flavor. Members did not recognise which "Perfection" this variety was. The Hon. Sec. tabled Reinette du Canada apples, from trees purchased by him as Ben Davis. Members were pleased with the pleasant acid flavor of the apple, but did not think it would be recognised as a first-class export variety. A long discussion ensued *re* prices realised for the different varieties exported to England, and on the liability of certain varieties to "bitter pit" disease. The Cleopatra was considered to be the finest apple grown, but, unfortunately, was especially susceptible to all the diseases affecting the apple. Members have planted largely of this variety.

QUESTION BOX.—It was decided to establish a public question box in connection with the work of the Branch.

**Gumeracha, June 14.**

Present—Messrs. W. Cornish (Chairman), W. H. Jamieson, W. Green, W. V. Bond, S. Hannaford, W. J. Hannaford, Dr. J. R. Stephens, W. A. Lee, R. P. Scott, A. Moore, D. Hanna, and Dr. Nicholls (Hon. Sec.).

CODLIN MOTH.—Mr. W. Green initiated a discussion on the necessity for steps being taken to prevent the further spread of the codlin moth. He said it was useless for growers in the hills to attempt to cope with it unless more stringent measures were taken in Adelaide. Every wholesale place in the city was a distributing centre, as the boxes and other packages brought from there contained the larvæ. The country growers would have to press for vigorous action on the part of the authorities. Even if this resulted in the eradication of every apple and pear tree on the plains near the city, it would pay us in the end to compensate these growers for their trees, though he thought such compensation, if necessary, should come out of the public funds. They could easily keep their own district clean if it were not for the continued re-infection. Mr. W. J. Hannaford said the bringing of pressure to bear on the growers in the Central District was all right if they could say how these growers were to deal with the pest. His own experience with spraying with Paris green had not been a success; and, besides, he was told by Mr. Ind that the moth attacks oranges, and these trees would therefore have to be dealt with. Mr. S. Hannaford also considered spraying useless, and, with regard to the city, he did not see that they could do anything. He had found the codlin moth caterpillar in ripe apricots. [The codlin moth caterpillar never attacks citrus fruits. It has been found occasionally in plums and apricots, but repeated attempts to hatch out moths from such caterpillars have failed, and there is every reason to believe that they do not properly mature in such

fruits. Their proper food is the pulp of the apple, pear, and quince, and unless they get this there is not much danger of their maturing.—**GEN. SEC.**] Mr. Jamieson said Mr. Quinn's experiments at the Lunatic Asylum grounds were reported to be a success, but it seemed to him to be a question of what success meant, as the affected fruits on the treated trees varied from fourteen to 120. [On trees bearing from 233 to 1,430 apples.—**GEN. SEC.**] Mr. Green said he understood that at the Lunatic Asylum garden the trees sprayed by Mr. Quinn gave 90 per cent of clean fruit; those sprayed by the lunatics under the direction of the gardener about 40 per cent.; and those not sprayed did not give a single apple unaffected. Discussion adjourned till next meeting.

**PAPER.**—Mr. Moore read the following paper on "Clerical Work on the Farm":—

So much has been written and spoken about the manual work on the farm that, for the sake of variety, it would not be amiss, perhaps, to discuss the clerical part.

Producers are again and again urged to work more intelligently as regards outside operations, to keep abreast of the times by using implements and machinery best adapted for their particular work, to use fertilising agents to keep the soil up to high-water mark in producing qualities—in fact to work systematically and scientifically in all phases of their work if they wish to compete successfully with other countries. If it is desirable to work on such lines—and we agree that such is the case—it appears to me that a more systematic method of keeping farm records might fairly be urged upon our community. Workers in every branch of operation in the world (national and otherwise) find it essentially necessary to keep correct written records of events and transactions for the sake of accuracy, and for reasons which are obvious. The mariner with his log, the explorer with his note-book, national, municipal, and district records, are simply illustrations of what is necessary in those cases.

The same idea is applicable to the farmer, though perhaps to a less degree; but certainly I hold the opinion that the more scientifically we work the land, the more necessity is there to keep a true and faithful record of our proceedings.

We have no control over droughts, and many other ills that we are heir to, which might possibly land us in severe straits; but at least we can so keep our accounts as to enable us to know our position.

Some system of book-keeping, then, should be adopted by every farmer. As a class, we are under a reproach for neglecting this branch of duty, and the sooner we wipe off this reproach the better.

We have wisely adopted the practice of mixed farming where practicable, and the natural facilities for this system of farming are greater in this district than in many parts of the colony. Hay, peas, dairying, pigs, poultry, potatoes, &c., are often cultivated on the same farm. You will readily see, therefore, that the farmer who wishes to know how each industry is paying him should keep separate accounts of each. The cost of production on the one side, and the amount realised on the other, will show very speedily whether the venture is profitable or not. It is better and more satisfactory in every way to know exactly how each claim pans out than to have only a general idea of the business as a whole. If one branch of the business is carried on at a loss, the sooner we know it the better, for to know a disease is the first step towards suggesting a remedy.

A complicated and elaborate system of book-keeping, fortunately, is not required, and since some practical suggestions may be looked for, I would mention what books would, in my opinion, be serviceable.

A scribbling diary should be of importance to the farmer generally. Every day's operations may be written down briefly and concisely, the nature of any business transaction, the state of the weather, direction of wind, and anything you may think of sufficient interest to chronicle. No one who keeps a diary will regret it, and it becomes a help to him in his farming operations. As a book of reference he will find it much more reliable than the average memory, or even the best memory that ever existed. There is no disputing facts that are jotted down every day. It is astonishing what errors we are liable to make (and stick to) over past events which a diary would soon rectify.

For accounts proper I would suggest a journal or day-book, in which the transactions may be set down as they occur, without distinction as to their nature; a ledger, where the various items may be placed in their proper order (each tradesman's account should be kept separate); for wages a separate page for each workman; banking account, stock-book, &c., according, of course, to the individual tastes and requirements of the operator.

As hinted before, each branch of industry should have its own set of entries to show the profit or loss, as the case may be, and the whole system may be so arranged that a balance-sheet can be drawn out at any time, and without difficulty.

The time is past, if it ever existed, when the farmer can reasonably expect to do full justice to his occupation without paying due regard to the clerical branch of his work.

In addition to the foregoing, mention might be made of household and living expenditure, such being in many cases, I am afraid, "an unknown quantity." There are so many small items which we perhaps do not enter, but which, during the year, may total a considerable sum. "I can't imagine where all the money goes," is not an uncommon expression among farmers, and I leave it with the members to say whether the necessary action is taken to secure this information.

It goes without saying that business letters and all correspondence relative to the farm should be promptly attended to; receipts and letters of importance to be filed for future reference. If the clerical work on the farm is seen to as it arises, the benefit and satisfaction gained far outweighs any little inconvenience connected with its execution.

In the discussion which followed, Mr. Moore said this matter was not much discussed amongst farmers; it was usually considered to be a personal matter. It was often stated that the only account-book kept by most farmers was their bank-book, and this he thought was a reflection on the business capacity of the farmer. Several members pointed out the difficulty they had in doing the work as indicated by Mr. Moore. The Hon. Sec. said this would disappear under the present liberal system of education. The farmers, however, took their children away from school as early as possible, and this was often just when they were beginning to learn how to learn. Dr. Stephens supported, and, after further discussion, a sub-committee was appointed to draw up a scheme for establishing night classes at Gumeracha.

### **Port Broughton, June 19.**

Present—Messrs. G. Pattingale (Chairman), R. W. Bawden, B. Excell, J. Harford, H. M. Peel, J. Barclay, W. Bennier, W. R. Whittaker, I. Rayson, and S. M. Bawden (Hon. Sec.).

**BREEDING DRAUGHT STOCK.**—Mr. R. W. Bawden inquired whether it paid to breed draught stock in this district; and, after discussion, it was resolved that it does, providing the proper kind of sire and dam is used. It was decided to ask the Pine Forest and Mundoora Branches to co-operate with this Branch in securing the services of a suitable stallion to travel the district this season.

**SEASON.**—Splendid rains have fallen during the present month, and there will now soon be some green feed for stock.

### **Baroota Whim, June 12.**

Present—Messrs. F. H. Flugge (in chair), C. W. Hoskin, M. Pillion, F. C. Bessen, W. Brideson, T. J. Simper, J. E. Dunstan, A. Raneberg, and J. L. Watson (Hon. Sec.).

**OFFICERS.**—Messrs. A. J. Dixon and J. L. Watson were re-elected Chairman and Hon. Sec. respectively for ensuing year.

**SEASON.**—Rainfall for May, 0.540in. The want of rain is badly felt in this and surrounding districts; and stock of all kinds are in very poor condition, besides which a number have already died.

### **Penola, June 26.**

Present—Dr. F. Ockley (Chairman), Messrs. W. Miller, J. D. Wilson, L. W. Peake, J. W. Sundiford, D. McKay, J. Fowler, A. E. Stoney, and T. H. Artaud (Hon. Sec.).

**ANNUAL REPORT.**—The Hon. Sec. reported that during the past year eleven meetings were held, the average attendance being over seven. The Chairman gave a short *résumé* of the transactions during the year, and asked that another member should be appointed Chairman, as he did not wish to monopolise that office. Mr. D. McKay was elected Chairman, Mr. Fowler Vice-chairman, and Mr. Artaud re-elected Hon. Sec.

**DAIRYING.**—Members were of opinion that there had been considerable improvement of late years in the dairy stock of this district. It will, however, be necessary to take steps to continue and extend this improvement.

**AGRICULTURAL SCHOOLS.**—The Hon. Sec. reminded members that some months ago the Branch urged the establishment of branch schools of agriculture in various parts of the colony. He observed from the Governor's Speech that this was to be part of the Government policy. It was decided to urge the claims of Penola as a suitable place for a school of this sort.

**PURCHASE OF FRUIT TREES.**—It was decided to ask the Central Bureau to draw up a model agreement for protection of purchasers of fruit trees and vines against fraud.

**PHYLLOXERA-RESISTANT VINES.**—Members wished to know what steps were being taken to introduce phylloxera-resistant vines. [Seeds of the best varieties are being imported, and will be carefully propagated. Professor Perkins considered there would be a danger of introducing the phylloxera itself with vine-cuttings from France or America, consequently nothing will be done in this direction. Vines are in existence within this colony, raised from seeds of the best resistant varieties introduced several years ago. Mr. B. Seppelt has several, and a number of varieties were raised by Mr. W. Gill, Conservator of Forests.—GEN. SEC.]

### Bowhill, June 19.

**Present**—Messrs. W. G. F. Plummer (Chairman), W. Tyler, E. Weyland, C. Drogemuller, J. Gregory, A. Dohnt, J. McGlashan, J. Waters, J. Whitehead, H. H. Plummer (Hon. Sec.), and one visitor.

**SEASONABLE TOPICS.**—Mr. Drogemuller advised transplanting onions, cabbages, and cauliflowers; also planting potatoes. He found White Rose potatoes the best to plant at this season. Members considered this is the best time to prune deciduous trees; well work the soil in the orchard to destroy weeds, and if it is intended to plant more trees, see that the holes are ready beforehand. On the farm, repair all fences and gates, attend to the poultry by culling out old hens for fattening, and raising young chicks while there is green grass.

**ANNUAL REPORT.**—The Hon. Sec.'s annual report showed that during the past year eleven meetings were held, the average attendance being over nine members and four visitors. Seven practical papers were read, and these, with other practical matters, were well discussed. Owing to the severity of the season, the experiments with seeds were not satisfactory, though the products of plants raised from seed grown in the district in some cases showed an improvement over the results obtained the previous year from new seed sent out by the Bureau. He considered this due to the fact that the plants became acclimatised, and advised members to bear in mind that with new seeds they often got better results the second or third year. One plant of much value had been introduced, viz., the "Cow pea" (*Dolichos sinensis*), which, with a little irrigation, had grown luxuriantly, and as it was valuable both for man and beast, would, he believed, prove a decided acquisition. A question box had

been established and had proved of considerable benefit, and he recommended that an effort should be made to obtain a specimen case to hold samples of plants, weeds, insects, &c., identified by the Central Bureau officers, together with notes as to uses, treatment, &c. Mr. A. Dohnt reported as to use of the enema purchased by the Branch. Mr. McGlashan said he injected flour and water, mixed to a very thin paste, for sand, with satisfactory results. Messrs. W. G. F. Plummer and H. H. Plummer were re-elected Chairman and Hon. Sec. respectively, and thanked for their services. Mr. Dohnt was elected Vice-chairman.

**ARBOR DAY.**—The members elected themselves into a committee to arrange for holding an Arbor Day during present season.

**POULTRY.**—Mr. Drogemuller read a short paper on Poultry. He raised fowls during nine months in the year with success. His fowls were crosses from various breeds, the hardiest being the cross between the Dorking and Brown Leghorn. Their feathers being closely set, they stand the cold weather best. He found the more the breeds were crossed the better layers he got, but it is essential to introduce fresh blood every year, and not inbreed. He gave his fowls as much as they would eat. He has been getting eggs from October till the present time, receiving during that period over £25 for eggs. He has young hens coming in every month, so that the supply is kept up. With wheat above 3s. per bushel he did not believe it would pay to breed poultry for export. Mr. Tyler agreed as to the necessity for introducing fresh blood into the poultry yard, or the stock would soon become a lot of weeds. At the present price of eggs it paid to feed the fowls on wheat; he would give them as much as they would eat. Mr. McGlashan said he found poultry did better if fed regularly, with an occasional change of diet. It was a mistake to raise chickens only when eggs are cheap, instead of all through the year. By the latter practice they got eggs right through, and any outlay was amply repaid. Mr. Gregory said they must guard against over-feeding; poultry did much better if provided with plenty of wash sand or gravel, as it was essential to cleanliness and aided digestion. In reply to question, Mr. Drogemuller said he had about seventy head of poultry, and got twenty dozen of eggs and upwards per week on a bushel of wheat.

### Swan Reach, June 10.

Present—Messrs. O. Kohnke (in chair), J. L. Baker, R. J. Harris, L. Fidge, A. Fischer, F. Fischer, J. D. Scott, P. A. Beck (Hon. Sec.), and one visitor.

**FRUIT-TREE AND GRASS-SEED PLANTING.**—A discussion took place on the advisableness of planting fruit trees and vines in this district. Members considered stone fruits most suitable. Mr. Harris said he found Johnson grass very good on light sandy soil. It obtained a good hold, and, once established, stood the dry weather splendidly, proving excellent feed for stock of all kinds. Seed should be sown about the middle of September. He had tried other grasses without success.

**RABBIT DESTRUCTION.**—Members inquired as to best methods of dealing with this pest; because, in spite of vigorous efforts to deal with the rabbits, they are still plentiful in this locality. Mr. Kohnke said he had got best results from poisoning with phosphorised pollard, made in the following way:—“Dissolve one stick of phosphorus in a little bi-sulphide of carbon, stirring carefully with a stick; then take 10lbs. of pollard and 4lbs. of sugar and mix thoroughly with the dissolved phosphorus, making it into a thick paste. Roll this out, and either cut into small squares or make into pellets about the size

of small marbles. Place these in the burrows, or along a newly-turned furrow. Other members spoke of the good results from use of phosphorised pollard. [Care should be taken in using bi-sulphide of carbon, as it is a poison, and the fumes will kill all animal life. It will be better and safer to boil the phosphorus in about two pints of water until thoroughly dissolved.—GEN. SEC.]

### Woolundunga, June 15.

Present—Messrs. N. Rogers (in chair), J. G. Moseley, W. White, J. Dunn, W. McLaren, J. Grunike, H. Johnstone, J. H. Michael, and T. H. Prosser.

EXHIBITS.—Mr. Moseley showed sample of barley, 18in. high, being a month's growth; also splendid potato, and inferior lemons which had been purchased as a good variety.

QUESTION BOX.—The following information was elicited in reply to inquiries in the question box. The general opinion of members was that mulberry and fig trees should only be pruned to form the trees, but Mr. Moseley said he pruned his mulberry trees to keep them low. Onions do best planted out in June. August and September is the best time to graft vines in the North. Barley, if irrigated when sown, will come up in five days in April, but will take twice that time in June. With trees eaten round by rabbits, graft if possible; if not, dig them up.

ANNUAL REPORT.—The Chairman's annual report showed that during the past year twelve meetings were held, with an average attendance of over seven members. Seven papers were read and discussed, and numerous matters of practical interest dealt with. Mr. G. Quinn, Inspector of Fruit, visited the district in July, inspected a number of orchards, giving demonstrations in pruning, &c., and also lectured on fruit pests, with especial reference to the codlin moth. Three meetings were held at members' homesteads, and were much appreciated. Messrs. T. H. Prosser, J. H. Michael, and N. Rogers were elected Chairman, Vice-chairman, and Hon. Sec., respectively, for ensuing year.

PAPER.—Mr. McLaren read a paper on "The Amateur Gardener," of which the following is the substance:—

In starting a garden, the amateur gardener practises different methods. One goes to an auction room, buys cheaply a lot of trees and vines, the varieties being quite a matter of indifference. He may have ploughed his land beforehand, but very often simply digs holes about eighteen inches square, plants the trees, gives them a good watering, and then expects them to grow without further attention. I have known of hundreds of fruit trees and vines being planted in this way, and then left to look after themselves. Buying at auction may be all right, but I would strongly recommend the beginner to ascertain from those with gardens already established what varieties suit the district, and plant only the best of these. The working man who manages his garden in his spare time cannot attend to, say, one hundred fruit trees and twice as many vines. A dozen trees and twenty vines, or thereabouts, is sufficient to start with. Give these plenty attention, get them well established the first year, and they will stand the dry seasons which may follow far better than if only half looked after the first year. Always remember that it costs just as much to raise an inferior article as a good one, but the latter will sell readily at a fair price, while the inferior one is difficult to dispose of. If the grower finds he has time to attend to more trees, he can extend his plantation gradually. In this district, when planting vines, always get some good drying varieties, as not only will raisins pay to produce, but the grower is less at the mercy of the buyer. With the fresh fruit it must be disposed of at once whether the market is up or down, but dried fruit can be kept over a temporary glut. Except for his own household, the amateur had better leave vegetable-growing generally alone, but peas, tomatoes, onions, or any of the melon tribe may be profitably grown, as these do not require a great deal of cultivation, and once well started plenty of water and shade is all that is required. If possible, have the garden well ploughed at least once a year.

**Lucindale, June 12.**

Present—Messrs. E. Feuerheerdt (Chairman), B. Feuerheerdt, E. Hall, A. Matheson, W. Dow, G. Newman, S. Tavender, E. Dutton, A. Dow, L. McInnes, and O. A. Witt (Hon. Sec.).

SEASON.—Rainfall recorded for April, 1·330in.; May, 2·870in. Members reported that their vegetable seeds were coming up well.

CODLIN MOTH.—With a view to prevent the introduction of this pest into the district, it was decided to secure the appointment of local inspectors under the "Vine, Fruit, and Vegetable Protection Act."

TUBERCULOSIS.—Mr. Dow read a paper on "Prevention of Tuberculosis," prepared and read by Sir J. Sawyer, at the Warwick Chamber of Agriculture.

**Johnsburgh, July 3.**

Present—Messrs. F. W. Hombesch (Chairman), J. Sparks, T. Thomas, T. A. Thomas, G. H. Dunn, W. James, P. Caughlan, T. Potter, L. Chalmers, and T. Johnson (Hon. Sec.).

BINDER TWINE IN CHAFF.—Mr. Dunn drew attention to the practice of some chaff merchants of chaffing up sheaved hay without removing the twine. Such a course was highly injurious to stock. Other members concurred, and instances were given where considerable quantities of chopped up binder twine were found in the feed boxes. They found that the larger merchants were the worst offenders in this respect, and attributed this to the fact that, having more powerful and rapid machinery, they considered it waste of time to remove the bands from the sheaves. It was resolved—"That this Branch condemns the practice of some merchants who cut up the twine with the hay, as the chaff is injurious to animals fed on it, and that efforts should be made by the Branches of the Bureau to have the practice put a stop to."

SPARROWS.—The Hon. Secretary reported that the sparrows were doing much damage to cabbages and similar plants, and wished to know how to deal with the pest. The Chairman said he believed that if a board were nailed flat on a post, brushed over with glue and some grains placed on it, it would attract the sparrows in numbers within a small space. If the board is placed within easy shooting distance of some cover, a person on the watch could kill a large number of birds. [Stick small branches along the rows, and wind finest black cotton to and fro. This will keep them away.—GEN. SEC.]

NATIVE FODDERS.—The Hon. Secretary tabled sample of grass found growing in very large bunches in the rough hills. It was commonly called spinifex, or kangaroo grass, and had been the means of saving a lot of stock this year. If chaffed up and given with bran or pollard the animals ate it very readily, and kept up fairly well. It grows very rapidly after rain, and the kangaroos and wallabies live on it in dry seasons. A member wished to know if it would be any good for ensilage. To be forwarded to the Central Bureau for identification. [The specimen was without seed heads, and too far gone to be identified. If stock will eat it when green it would be of value if preserved as ensilage or grass hay.—GEN. SEC.]

PAPER.—The Chairman read the following paper on "Judging at Agricultural Shows":—

In the May number of the Bureau *Journal* I noticed a discussion at a meeting of the Pine Forest Branch on the advisableness of offering prizes at the field trials and shows, and also on the principles of judging. Although not quite agreeing with Mr. Mudge and the plan advocated by him, still I am thankful to him for opening a discussion on this subject, and I trust that other Branches will take the matter up, and bring about a decided improvement in the judging at our agricultural shows, which are red-letter days

(especially in the Northern Areas), where we can meet people from all parts of the district; see some choice flowers, some well-bred cattle and horses, nicely "got-up" implements and machinery, and so on. When the report of the show appears we learn that "Mr. A. received first prize for his machine, Mr. B. a prize for his horse," &c.; but if the question is put as to why they were successful, the answer generally is "Well, it must be the best—or, at least, the judges thought so"; but what prompted the judges in their decision is often apparently known only to themselves, and we return to our homes very little the wiser for our day's outing. The unsuccessful machinist consoles himself with the thought "Perhaps my turn will come next time. I will put on a little more varnish"; and the breeder of stock decides that next time he will give them an extra lot of feed—and things go on in this way without our receiving the least benefit, as far as the judging is concerned. Now, although the best way to judge an implement is to see it at work, I think a great improvement might be brought about if the judges gave us some reasons why they arrived at their decisions. This would cause no extra labor, as each set of judges may have a clerk with them, who could enter the remarks in a book and hand them over to the secretary of the show to be printed in full for the benefit of the public. I would suggest the following plan for agricultural implements:—Appoint three judges, one of whom, at least, should be a disinterested mechanic, because he would be better qualified to point out good or inferior workmanship, and possess a knowledge of the material used in the construction of any implement or piece of machinery. Again, almost any individual farmer imagines he possesses the best and most approved machine, plough, or wagon, and if he were to get another would certainly patronise the same maker. Thus they may be liable to show some prejudice against other makers unless certain good or bad points were brought under their notice. In cases where there are several entries in one class only the best need be mentioned. For instance, take a stripper:—"Judges' Remarks—Section D, (Class 216 (twenty entries): In this class only five need be mentioned. No. 7 is a well-made machine, but we consider beaters too light for heavy crops; should be made of steel instead of iron. No. 10—Crown wheel too narrow for loose soil. No. 11 is built of inferior timber. No. 14 is a well-made machine, but should have steel cheeks instead of cast iron, which would greatly add to its utility; but in our opinion is well worthy of a second prize. No. 18 is a well-made machine all through. The adjuster draught we consider a great improvement, and award it the first prize." If some similar remarks were made the public would have something other than paint, file, or currycomb to look at, and the mechanic something more than paint and file to think about; and our shows would not only be a pleasure, but we should increase our knowledge and help each other to improve our stock and implements. Possibly it would require more competent men to act as judges, and would completely do away with men who know very little about the article they are judging. I do not say the plan I have formulated, if carried out, would give satisfaction to all immediately concerned—probably it would cause dissatisfaction to some—but it is not for us to consider individual cases, but what is best for the community.

Members generally agreed that some improvement in the judging at our agricultural shows is necessary. Judging of horse stock is frequently a farce, as people are often appointed as judges who are not qualified to give a verdict.

**BONES AS MANURE**—Mr. T. Thomas called attention to the large quantities of bones which were lying about. He thought it a pity they were not utilised as manure, and asked for information as to best means of converting them into manure, and the quantities to be used per acre for cereals and vegetables. [To convert bones into manure, break them up small, moisten with sulphuric acid and water (equal quantities of each), and when dry grind to powder. The quantity to use for different crops differs greatly, and also varies according to the soils. For cereals, 80lbs. to 120lbs. per acre if the drill is used, and from  $1\frac{1}{2}$ cwt. to  $2\frac{1}{2}$ cwt. if sown broadcast would be a fair dressing. Vegetables require much heavier manuring.—GEN SEC.]

**RAINFALL.**—For June, 1.170in.; on July 1, 0.500in.

### Maitland, July 3.

Present—Messrs. C. F. G. Heinrich (Chairman), J. W. Shannon, Thos. Bowman, J. Pitcher, H. Wundersitz, H. Adams, J. S. McLeod, J. W. Handley, A. Jarrett, H. Bawden, J. Kelly, C. W. Wood (Hon. Sec.), and two visitors.



**ANNUAL REPORT.**—The Hon. Secretary's annual report showed that during the year eleven meetings had been held, with an average attendance of just over six members. He regretted that the members had been so apathetic, as unless they attended regularly, and took more interest in their work, the Branch would do but little good. He would like to see more visitors present also. Papers on "Combination amongst Farmers," "The Blood Horse," and "Caponising," had been read, and these, with many other subjects of practical interest, had been well discussed.

**HORSE COMPLAINT.**—The Chief Inspector of Stock wrote *re* complaint prevalent amongst horses in the district. He advised giving the animals sulphate of iron and salt, also moistening hay or chaff with molasses and water.

**PAPER.**—The Chairman read a paper on "Hints to Farmers regarding Protection and Repairing of Implements," of which the following is the substance :—

We all know that a farmer must work long hours, and a good many think he has only to work with his hands. This is, however, a great mistake. An intelligent farmer must work with his head before using his hands. A young man learning a trade has to serve for three or four years, or more, before he is considered fit to do his master's work, but before he is at all expert he must serve a much longer time. And so it is with the farmer; one not brought up on a farm cannot learn all in three years. Even sons of farmers, who have been brought up on the farm, have much to learn. He thought the farming, as carried on in South Australia for many years, was capable of much improvement, and he would deal with one branch which was sadly neglected, namely, the care of implements and machinery. Everything should be kept in good repair. It was very poor economy to allow valuable implements to get out of repair in order to save expense. The sooner damages are repaired the less the cost, and the less real injury to the machinery. Implements in bad order cost more in time and labor to work, and do not do their work properly, with the result that the crop is seriously diminished. Then, in too many cases, the implements are left out in the open without any covering. Seeing that some of our implements cost up to £50, and others nearly as much, surely it will pay to prepare a shelter shed of some kind. We only use some of them for four or five weeks in the year, and if properly attended to, and kept in repair, they will last a lifetime. We know, however, that in many cases these implements are ruined in a few years, and this is solely through neglect. He thought with our labor-saving conveniences, the present generation is not so careful as the previous. Every farmer should endeavor to do all the simpler repairing jobs himself. He will save both time and money if he does. He may not make a very good job at first, but, with a little practice, will become more expert. Let the boys have schooling of various sorts. Teach them how to use the tools when young, and they will grow up handy men, capable to do all sorts of work necessary on the farm. With an expense of about £7 a blacksmith's forge can be set up. The principal items of expense will be the bellows £2 10s., anvil £2, stocks and dies £1 10s., four pairs of tongs, sledge hammer, hand hammer, and other tools will cost a little over £1; many can be made by the farmer himself. He can also purchase all the carpenter's tools that he requires for two or three pounds. Some will say this will do away with the tradesmen, but this is not so. We will still require the professional to do the more delicate and extensive work, and the saving effected by doing the other work ourselves will allow us to spend more with the tradespeople.

Most of the members spoke in favor of the writer's remarks.

### Port Elliot, July 3.

**Present**—Messrs. C. H. Hussey (Chairman), E. Wood, H. Green, F. T. Fischer, J. Virgin, J. Brown, and E. Hill (Hon. Sec.).

**DISEASE OF FOWLS.**—The Central Bureau advised that Mr. D. F. Laurie was of opinion that Mr. Wood's fowls might be suffering from hydatids. Mr. Wood said since the early rains and growth of green feed the disease has apparently disappeared,

**SEASON.**—Seeding is finished in this district, and the season, so far, has been one of the most favorable ever experienced. Mr. Brown tabled the fruit of American plum gathered within the past week. It was perfect in every respect, and came from a tree which blossomed in the summer in consequence of the ground being irrigated.

### Holder, July 2.

**Present.**—Messrs. F. A. Grant (Chairman), F. Rogers, J. O'Connell, E. Moritz, J. Maddocks, J. Mitty, F. Slater, E. Crocker, C. Anderson, H. Blizard, J. Young, J. J. Odgers (Hon. Sec.), and one visitor.

**SEED EXPERIMENTS.**—Members reported that the cabbages and onions from Bureau seed were doing well. Danish Island oats planted a fortnight previously were 2in. in height. Dart's Imperial wheat, sown at Ramco early in June, was from 6in. to 8in. high.

**BREAKWINDS.**—Mr. Moritz tabled branch of tree found growing on the settlement. It was an exceedingly quick grower (having made 8ft. of growth in twelve months), with dense foliage, and makes a splendid breakwind. There was only this one plant of it on the settlement, and no one had ever seen it here before. He believed the seed had been carried down the river.

**RAINFALL.**—Recorded for June, 1.465in.

**PAPER.**—Mr. Slater initiated a discussion on "Bad Seasons" by reading from the *Journal* a paper prepared by Mr. Michael, of Woolundunga Branch. Members considered the advice given in the paper good and practical, and if followed by the farmers would prove beneficial. The advice to get rid of inferior stock was strongly supported.

### Pine Forest, June 15.

**Present.**—Messrs. A. Inkster (Chairman), J. St. J. Mudge, A. Mudge, W. Burgess, and R. Barr, jun. (Hon. Sec.).

**BUSINESS.**—This meeting was held at the residence of Mr. Mudge. Matters in connection with the forthcoming field trial were dealt with. Mr. Mudge said, from previous experience with stock poisoned by the native tobacco (*Nicotiana suaveolens*), he was confident that Mr. Burgess's cows were poisoned by the same plant.

### Gawler River, June 24.

**Present.**—Messrs. A. M. Dawkins (Chairman), T. P. Parker, C. Ayling, J. Bushbridge, J. Badman, A. Bray, J. Hillier, H. Roediger (Hon. Sec.), and one visitor.

**EXPERIMENTS.**—The Hon. Secretary reported that the roots of *Paspalum dilatatum* sent to him by the Central Bureau, though carefully attended to, had failed to grow. Other members reported failure with seeds owing to the dry season.

**OFFICERS.**—Messrs. A. M. Dawkins, J. Badman, and H. Roediger were re-elected Chairman, Vice-chairman, and Hon. Sec. respectively, for ensuing year.

**MANURES.**—The Chairman read a paper on "Manures and Manuring."

In agricultural circles of South Australia no subject has received so much attention during the last two years as that of manuring. The success of the combined manure and seed drill has caused quite a boom in artificial manures and drills. From its very commencement the Agricultural College has, both in theory and practice, advocated the use of artificial manures

and drilling in the seed, but it was not till the last few years that the colony awoke to the fact that it pays to use artificial manures. The success of the Yorke's Peninsula farmers with 90lbs. of phosphate per acre read like a fairy tale, and then it caught on, until now a farmer is considered behind the times unless he is using artificial manure and a drill. I am afraid in some cases the hopes will not be realised by a big crop following the drill and manure. Men are drilling all sorts of manure on land in all conditions in the hope that what has been neglected in cultivation can be made up in manure. Now, unless cultivation has been thorough, and the land in a good mechanical condition, the result will be disappointing; manuring must go hand in hand with good cultivation to be a success. Scientific knowledge is a prime requisite in modern farming. In the early days of the colony men had virgin soil and got big averages; new land will always give a good average. As long as I can remember up to within the last five years my father always had two or three acres of new land, and from that new land I never remember reaping less than 20bush. per acre, no matter what the season. But it is impossible to get a full yield of wheat for many years. Without manure the land gradually got weaker, and the crops less and less, until we had to resort to the system of one crop in three years, when the fertility was kept about stationary by the decay of the soil.

History teaches us that in the thirteenth or fourteenth centuries farmers of Great Britain were only able to obtain 10bush. of wheat per acre, while to-day farmers on the same land can get 30bush. The reason is that the farmer of to-day is versed in the art of manuring. Practice and science have taught him to use a variety of plant foods, which enable him to increase his average and grow healthy and luxuriant crops.

The science of manuring is quite of modern birth. It was in 1818 that Sir Humphry Davy wrote the first work on "Agricultural Chemistry," to explain the true scientific basis of manuring and cultivating soils, and in 1840 Liebig gave the world the most important work ever written on agriculture. Since then many important fertilisers have come into use. Plants require for their development and growth a supply of carbonic, nitric, sulphuric, and phosphoric acids, also potash, iron, lime, magnesia, silica, &c. Now, if these substances are continually extracted by growing crops without an equivalent being returned, the soils must gradually lose their fertility. A farmer who manures his land feeds his plants. Manures are plant foods. The great art of manuring is to supply to the plant the substance that has been consumed. A chain is only as strong as the weakest link, and a soil is only as fertile as the minimum of any one essential ingredient. For example, a soil may contain enough phosphoric acid to grow only 10bush, but enough of the other constituents of the plant to grow 20bush. The lack of phosphoric acid would prevent the other constituents being used by the plant—the excess would be unavailing, and the yield would be only 10bush. If you added a supply of phosphoric acid equal to the other constituents the soil would then yield its 20bush. It is because of this reason that the use of bonedust is disappointing on autumn-ploughed land as compared with fallow—there is not sufficient soluble nitrates to use all the phosphates of the bonedust. I have seen bonedust tried repeatedly on autumn ploughed land, and in some cases it gave no result, and in others very slight, but on fallow ground in good condition, with moisture and tilth, it has doubled the average.

How to find out what manure the soil requires is somewhat difficult. A chemical analysis is faulty, because it tells what the soil contains, but not its condition. With strong acids the chemist is enabled to dissolve and unlock what is not available to the plant. A soil may contain lime, potash, and phosphoric acid, and yet be almost barren if they are in an insoluble form. I think the best way is to ask the plant. Experiment with different manures; try them side by side, and the plants will soon tell you what they want. When I planted my orange trees I experimented on different rows with different manures in order to find what manure was best adapted to my soil and trees. I used a potash manure, and at once concluded that the land did not want potash. The use of sulphate of ammonia was disappointing. I have frequently tried a little sulphate of ammonia on a wheat crop, and last year I top-dressed some barley, but in all cases the results were disappointing. I remember Professor Custance saying during a farm class that he was unable to get the same benefit from the use of nitrogenous manures in Japan and Roseworthy as he could in England. He was of opinion that phosphoric acid was the first to give out in a warm and dry climate.

Wheat that is manured with nitrogenous manures is more readily blighted by the hot winds and more subject to the attacks of red rust. Such being the case, it seems to me that value per unit of nitrogen and phosphoric acid should be allowed for South Australian conditions, that the nitrogen should not be valued so high and the phosphoric acid higher.

This subject, no doubt, will receive more attention as our farmers gain more experience. It is gratifying to know that during the past few years farmers have turned and are turning their attention more and more to the teaching of men like Professor Lowrie, and it is to be hoped that the knowledge gained may be increased a hundredfold. The art of manuring land is in its infancy in South Australia; but I believe in a few years it will receive much more consideration and study, and a knowledge of manures and their uses be regarded of paramount importance to the farmers and all employed in agricultural pursuits.

In the discussion which followed, Mr. Dawkins said that with bonedust the best results were obtained if the manure is spread and worked into the fallow in spring. In answer to question by Mr. Parker, members were of opinion that farmyard manure was best for limestone soil. Mr. Parker said he had had very good results with peas by using fowl manure on light soil.

RAINFALL.—For six months ending June 30, 5.100in.

### Angaston, June 26.

Present—Messrs. R. Player (Chairman), W. Sage, F. Thorne, W. Sibley, A. Sibley, F. Salter, A. Salter, P. Radford, A. Friend, J. Vaughan, S. O. Smith, and E. S. Matthews (Hon Sec.).

SPRAYING.—A sub-committee was appointed to give effect to resolution of the Branch, "That this Branch in particular, and fruitgrowers generally, should recognise in some practical way their indebtedness to Messrs. F. C. Smith, W. Sage, and A. B. Robin, for their persistent advocacy of the benefits of spraying, and its attendant good results to all concerned."

NOMENCLATURE OF FRUIT.—It was decided that the Central Bureau be asked to bring the matter of the nomenclature of fruit before the Branches in the apple-growing districts, and arrange to call a meeting of apple-growers with a view to come to some decision as to the most suitable name for each variety of export apple, known at present under several names, and to use only the name selected. It was thought the occasion of the Annual Congress in September would be a suitable time. [A meeting of apple-growers will be called during show week to consider this and other matters in connection with the export of fruit.—GEN. SEC.]

PAPER.—Mr. R. Player read the following paper :—

#### Fodder in Seasons of Drought.

It occurred to me that a short paper on our experiences of the recent drought might be of some interest. It is of no use grumbling about the hard times, for that will not mend matters; yet one cannot help feeling depressed at the barren state of the country and the sufferings of the stock, especially the sheep. I believe the recent drought will do good, if it only teaches us a lesson to be more thoughtful, and to some extent prepared for a similar visitation in the future. The dire straits we have been placed in have driven us to all sorts of expedients to keep our stock alive. Fortunately we had a fairly good stack of hay to begin with. Our horses have lived entirely on that up to the present time, with judicious management, so they have been all right. To our cattle we allowed one kerosene bucket each of chaffed hay and straw, about equal parts, once a day. But that was not nearly enough for their requirements, so they had to fill up with vine cuttings, which they ate readily. I do not think vine sticks bad feed at all for cattle and idle horses, especially if the vines are pruned early, say as soon as the leaves are off. I believe that cuttings, if crushed and mixed with something else, say molasses, would make good food even in a good year. Stock seem to eat them with relish, and run after the wagon when they see it coming. Our cattle look no worse now than they did at the beginning of the season, though I should not recommend it as a "milk producing" fodder. With sheep it is different; they require something a little less woody. We have managed to keep them alive on shea-oak and peppermint. The former is a real good stand-by, but, not being so plentiful as the latter, did not last long. There are two or more kinds of peppermint. The darker the leaf the better. We have labored hard to cut down a tree that had beautiful thick green foliage on it, and they would scarcely look at it. Then we have tried a scrubby old tree with sparse and dark foliage and they ate it readily. We have to keep a sharp look out every day to see that they do not get entangled in the branches, which in their weak state they often do. Had it not been for the lambing ewes our losses would have been next to nothing. Because some of our sheep have died we have not allowed it to be all loss. We found it to our advantage to kill those that were past hope, instead of letting them die, as the skin from a "bled" carcass is of a bright yellow color, and commands a higher price than one from a sheep which has been allowed to die. In the latter case the skin goes black when dry. We skin them carefully, with as few holes as possible, and

then stretch the skins lengthwise on a rail and dry in the shade, leaving the trotters on till dry. We boiled down the carcasses for pigs and fowls. In former years, during the winter months, we have not had a single egg, but this winter, owing to a warm breakfast of boiled mutton every morning, the fowls have laid splendidly, and eggs from 1s. 6d. to 1s. 10d. per dozen mean money. The bones, too, help to compensate in a small way for the loss of our sheep. As we boil the carcasses well the fowls have no difficulty in picking the bones clean; these we gather and put in bags hung up for the purpose. We find a ready market for good clean bones. A neighbor of ours who keeps sheep used to let them lie where they died, and did not even trouble to skin them. His plea was that he was putting in his crop and had not time. He seemed to lose sight of the fact that he was giving up a certainty for an uncertainty. He had to wait eight or nine months for a possible return from his crop, whereas he was throwing away ready cash in the shape of sheepskins. I may say our crop was in six or eight weeks later than his, yet it was above ground quite as soon.

### Auburn, July 9.

Present—Messrs. E. M. Dudley (Chairman), J. Hean, P. Cornwall, S. Ford, W. R. Klau, Dr. J. W. Yeatman (Hon. Sec.), and one visitor.

**FRUIT BOARDS**—Communication from Tanunda Branch in reference to the advisableness of the Vine, Fruit, and Vegetable Protection Act being amended to provide for the establishment of local fruit boards to deal with local pests was considered. Members were of opinion that it was not at present necessary to appoint a board for this district.

**PHYLLOXERA PROTECTION ACT**—The proposed Phylloxera Protection Act was carefully considered, and found general favor. Members were, however, unanimously of opinion that it required amending in the following direction:—(1) No vines should be taxed until six years old and returning something for expenses incurred in planting, &c. (2) The amount of taxation and compensation should be proportioned to the value of the vineyard, and for this purpose vines might be divided into three classes, viz., (a) common and mixed varieties; (b) the better varieties, such as Shiraz and Carbenet-Sauvignon, &c.; and (c) trellised vines—the compensation in these classes should be £10, £20, and £30 per acre respectively. (3) That owners of young vineyards destroyed for the benefit of the rest should receive some compensation, even if they have not contributed to the fund. (4) That after a certain definite sum has been invested sufficient for present insurance purposes taxation should cease, but young vineyards coming into bearing should contribute *pro rata*.

**SEED DRILLS**.—The Hon. Secretary inquired whether it was better to have the coulters on seed drills 7in. or 8in. apart. Mr. Klau said his experience was that the latter was best.

### Tatiara, June 12.

Present—Dr. Murray Gibbes (Chairman), R. Seown, G. Ferguson, G. Milne, Thos. Stanton, E. T. Meyer, W. Montague, H. Killmier, and W. E. Fisher (Hon. Sec.).

**APPLE-GROWING**.—Mr. Meyer said amongst the thirty varieties of apples shown at the Mount Gambier conference the following were recommended as being suitable for export, viz.:—Cleopatra, Jonathan, Dunn's Seedling, Baldwin, Duncow's Seedling, Stone Pippin, Scarlet Nonpareil, Rokewood, Nickajack, and Lord Wolseley. Mr. Milne said he considered the list a good one.

**TIGHT HOOPS**.—The Chairman said that some three months ago a pony of his became lame, and thinking the shoes pinched, he had them removed, but the animal gradually became worse. Thinking exercise would do him good, he was driven three or four miles, principally in sand, with the result that next day he could hardly move his forelegs, standing with them outstretched.

He could not notice any extra heat, either in the shoulders or feet, and as the other pony was suffering from strangles, he thought this one might have it in a suppressed form. He therefore fomented his shoulders and feet and gave a bran mash with saltpetre and Epsom salts. This treatment, however, failed to have any effect, and the general opinion of those who saw the animal was that he had foundered. One day, however, after a fall of rain, the pony was found galloping about as though nothing was the matter, and he now attributed the lameness to "tight hoofs," resulting from want of moisture. The pony was in good health, excepting as regards his feet, the whole time, and had no chance of over-eating or getting rheumatism.

**SEED DRILLS.**—The Hon. Secretary said the "Superior" seed and manure drill had been worked on several farms in the district. It did its work admirably, and a boy of 12 could manage it.

### Lipson, July 3.

**Present**—Messrs. E. J. Barraud (in chair), R. Batten, E. D. Swaffer, A. W. Potter, and H. C. Thorpe (Hon. Sec.)

**WILD DOGS.**—A communication was received from Colton Branch, urging that united action should be taken to bring before the Government the necessity for destroying the wild dogs on the unoccupied Crown Lands in the district.

**INSECTS IN DRIED FRUITS.**—Mr. Provis asked how he could keep dried fruits from being destroyed by insects. Mr. Potter said if the fruit was sulphured before being dried it would render it impervious to insects. [If the fruit is so impregnated with sulphur as to prevent insects from eating it, it will most certainly not be fit for human consumption. Fruit dried in evaporators, "sweated" in a moth-proof room, and packed in close receptacles will not become "wormy," as the moths have no opportunity of laying their eggs on it. It has been stated that sun-dried fruit brought in during the heat of the day will not be attacked, but this is doubtful. Plums, after being scalded and sun-dried, can be dipped in scalding water, and then packed in a moth-proof room to sweat. Other fruit might be subjected to a certain heat, say about 180° F., indoors to destroy any eggs or insects on them, and then be sweated and packed away.—GEN. SEC.]

**PAPER.**—Mr. Batten read a paper criticising the advice given on all hands to farmers, which he contended was almost always unpractical.

### Colton, July 3.

**Present**—Messrs. P. P. Kenny (Chairman), W. A. Barnes, W. L. Brown, W. J. Packer, A. A. Stephens, M. S. W. Kenny, J. L. Higgins, A. S. Bartlett, W. McElder, E. Whitehead, R. Hull (Hon. Sec.), and four visitors.

**AGRICULTURAL SOCIETY.**—A long discussion took place on the advisableness of affiliating with the Agricultural Society, but it was the opinion of the members that the two could not be conveniently worked together, though the Bureau would do all in their power to help in making the shows a success.

**DOG-PROOF FENCING.**—The Hon. Sec. wished to know what it would cost to erect a good dog-proof fence in very rough country, the cost of maintenance per mile, and whether the mallee scrub would have to be cleared. Material would have to be carted about fifty miles inland. [Can any of our readers supply this information?—GEN. SEC.]

**Albert, July 1.**

Present—Messrs. J. Wetherall (Chairman), H. Smith, T. Cooper, J. Brewin, H. Lane, G. Acres, G. Haggard, S. Marks, A. Beer, J. Gill, J. Fahey, G. Anderson, A. Brant, and W. H. Edwards (Hon. Sec.).

SEED EXPERIMENTS.—Members reported as follows on experiments with seeds received from the Central Bureau:—Giant Pera cucumber, Boss and McIvor watermelons, all good, especially the latter; King of the Mammoth pumpkin, good quality, but not a prolific bearer; Burpee's Lima, Henderson's Lima, Crease-back wax beans, good; Rustless Golden Wax and Saddle-back wax beans, fairly good; Grand Rapids sweet melon, very good quality, but liable to crack.

**Lyrup, July 6.**

Present—Messrs. A. Pomeroy (Chairman), A. Thornett, D. Bennett, F. E. Chick, T. R. Brown, P. Brown, T. Nolan, W. H. Walling, E. J. Dwyer, W. H. Wilson (Hon. Sec.), and one visitor.

RAINFALL.—Recorded for June, 0·823in.

MANURING AND LEMONS.—Mr. Thornett said he had seen very satisfactory results from manuring lemons. Sheepdung lightly dug in round the tree was very good. This work should be done as soon as possible.

SEED EXPERIMENTS.—Mr. Pomeroy reported that the Wheat grass and Wild Rye grass were growing well; Dart's Imperial wheat and Danish Island oats were about 1ft. in height, and stooling out well.

**Mount Remarkable, July 8.**

Present—Messrs. A. Mitchell (Chairman), S. Challenger, W. Girdham, A. Pope, G. Yates, P. H. Reichstein, W. Lange, C. E. Jorgensen, and T. H. Casley (Hon. Sec.).

FENCING.—Mr. Challenger read a paper on "How to erect a Cheap and Durable Fence," of which the following is the substance:—

When you have decided the height the fence is to be, the number of wires and gauge, send particulars to any ironmonger in Adelaide for iron posts, with pointed ends, and holes, up to six in each. These cost from £9 to £10 per ton, which amounts to about 4½d. each. Then get good split gum posts (6in. x 4in.), and strainers not less than a foot in diameter at the smaller end. Set the strainers up at distances of 120yds., and the split posts at 10yds. The second hole from the top should be bored with an inch auger to take barb wire. I find the best way to run the wire through the posts is to get a piece of plain wire the length of the strainer, attach it securely to the barb wire, then run it through the posts, then haul it through with a horse. Some will probably object that the barbs will be injured, but my experience has been that it is practically not harmed at all. Get the wire well strained, then drive in your iron posts at 10ft. apart until the second hole is level with the barb, then secure it to the post by a piece of wire. The other wires can be run through without moving the post. In addition to being cheap and quickly erected, a great advantage of such a fence is that it is not liable to injury from bush fires and white ants. The cost of cartage is practically nil, as two or three hundred of the iron posts can be put in a buggy or spring cart and taken anywhere. A good man can easily put up a strain a day, and if redgum posts are used, the fence will stand for fifty years. I have had for years a fence of this description, the four bottom wires being 6in. apart, the fifth 9in. from the fourth, and then 11in. between the next two. Sheep and cattle are kept, but I have never had a single animal break through.

Members were of opinion that such a fence would be cheap, effective, and durable.

### Strathalbyn, July 12.

Present—Messrs. M. Rankine (Chairman), G. Sisson, L. Dunn, W. M. Rankine, E. R. Morgan, B. Smith, R. Watt, and J. Cheriton (Hon. Sec.).

**FRUIT BOARDS.**—Members supported the establishment of local fruit boards to deal with local diseases of fruits.

**WEED.**—Mr. Sissons tabled plant taking possession of the land at Bull's Creek, destroying other herbage and grass. No stock would touch it. Members did not know the plant, and it was decided to forward the specimen to the Central Bureau. [Not in flower, therefore cannot identify it.—GEN. SEC.]

**OATS FOR HAY.**—Members took exception to General Secretary's reply to query of Stansbury Branch to the effect that the best time to cut oats for hay was when the tops begin to turn color, as if left later much of the grain is lost. The experience of members was that all oats should be left standing till the seed is past its milk stage, otherwise the hay will be bitter and stock will not touch it. This applies more especially to Algerian oats. [The General Secretary referred the inquiry of Stansbury Branch to some practical men, and obtained the information which the Strathalbyn members consider misleading. Mr. S. Goodc, of Central Bureau, who has had many years' experience here and in England, advises cutting before the oats turn color at the top of the ear. At the ninth congress, Mr. G. Milne, of Tatiara Branch, stated he got the best hay from Algerian oats cut when the tops are beginning to turn light. Other farmers also gave similar advice. I shall be glad if members of other Branches will kindly let us have the benefit of their experiences in this matter.—GEN. SEC.]

**COPRA CAKE.**—In reply to the Chairman, members stated that as a food copra cake gave satisfactory results, but it was too expensive.

**PLOUGHSHARES.**—Mr. W. M. Rankine said he found Mellor's new steel reversible shares more economical than either colonial or imported cast-iron share which he had used. Other members reported similarly.

### Kapunda, July 3.

Present—Messrs. G. Teagle (Chairman), G. Harris, H. King, H. A. Holt-house, J. P. Orchard, J. A. Schultz, Pat Kerin, W. Flavel, H. T. Morris, and T. Jeffs (Hon. Sec.)

**SEED DRILLS.**—It was decided to invite the importers of various seed and manure drills to take part in a public trial in this district, and a committee was appointed to make the necessary arrangements.

**PAPER.**—Mr. Harris, who claimed to have had thirty years' experience on the subject, read a paper on "Kitchen Gardening," of which the following is the substance:—

It is essential that good seed should be procured, and he advised the use of imported seed, as it had proved better than local. He believed the reason was that the seeds grown in cold climates were better matured, producing a better plant, and not so likely to run to seed. Seed should never be raked in, but the bed should be well prepared, then the seed sown broadcast, and just covered with one-third superphosphate and two-thirds ordinary soil. For transplanting cabbage and cauliflower, dig the ground well, make holes from 6in. to 9in. deep, fill with manure, plant on top. Parsnip and Carrot. —Trench the ground from 15in. to 18in. deep, then cover the bed from 4in. to 6in. deep with good rotten manure, lightly cover with some soil, sow in drills 9in. apart, and cover the seed with one-third superphosphate and two-thirds soil. Beat the parsnip bed well with back of spade. Turnip.—Prepare bed with superphosphate in same proportions as for parsnip, then cover. When about 3in. high transplant 9in. apart by 4in. in a row, and spread superphosphate. Onions.—Transplant 4in. by 3in. apart, and manure with superphosphate. Potatoes are not profitable in this district, except in sheltered places, and



when planted early enough to catch the winter rains. The kidney variety should be used, viz.: -The Beauty of Hebron, Early Rose, or White Elephant. Fodder Plants.—Kale is the most useful fodder plant for poultry, pigs, and cattle, and it possesses milk-producing qualities. The best variety is the Jersey Tree Kale, as it will stand for two seasons in good soil, and each plant will produce 2cwt. yearly. The young shoots are a good table vegetable. The most profitable way to plant kale is to dig holes 15in. square, 4ft. apart, the hole to be filled with manure and well watered in summer. Mangolds are not profitable in this district, excepting where water is very plentiful. All farmers should pay more attention to kitchen gardening, as it would prove very profitable, and always supply fresh vegetables.

### Tatiara, July 10.

Present—Dr. Murray Gibbes (Chairman), Messrs. J. Rankine, T. Stanton, H. Killmier, F. Smith, and W. E. Fisher (Hon. Sec.).

ARSENIC WITH CEREALS.—The Chairman reported that, owing to it having been stated that sheep had died after eating grass growing on soil on which arsenic had been scattered, he tried some experiments to test whether the arsenic could pass into the growing plant. He sowed three plots with barley, the first being watered with a saturated solution of arsenic, the second with barley and powdered arsenic sown together, and the third with barley soaked for twenty-four hours in a saturated solution of arsenic. No. 3 grew twice as luxuriant and high as the others, No. 1 being next best. Rabbits were fed on the plants without injury. He thought it would be worth trying arsenic water as a pickle in lieu of bluestone as a preventive of bunt and smut. It would also be worth trying whether steeping the seed before sowing hastened its germination.

CONGRESS.—Some discussion took place on the privilege tickets issued to members of the Bureau travelling by rail on Bureau business, the members being of opinion that the privilege was of no use to members attending the Annual Congress, as excursion tickets were in force at show time. The Hon. Sec. pointed out that tickets obtained on the General Secretary's certificate enabled the holder to break the journey if desired, and to start earlier and come back at any time, whereas the excursions were limited to certain days.

SEED DRILLS.—An exhibition of the "Farmers' Favorite" seed and manure drill was given on Tuesday, July 6, in the presence of a number of farmers and others, who were well satisfied with the even way in which the ordinary manures were distributed. A trial with sheep manure was also given; but this was not a success, being too coarse to allow sufficient to go through the drill to properly manure the seed. The crops sown at a previous trial with the "Superior Drill" at the end of May are looking splendid, and great interest is being taken in this practice.

### Meadows, July 5.

Present—Messrs. J. Catt (Chairman), W. Pearson, T. B. Brooks, G. Ellis, T. Usher, W. Nicholle, S. Lawrence, G. Rice, W. A. Sunman (Hon. Sec.), and one visitor.

FRUIT BOARDS.—Members favored the establishment of fruit boards, as advocated by the Tanunda Branch. They were of opinion that provision should be made for paying compensation to growers who have to destroy their fruit for the benefit of others from the rates levied in the district concerned.

**PAPER.**—Mr. Sunman read a paper on "Poultry," of which the following is the substance :—

My experience is that poultry-keeping pays. To get the most out of the industry select the kind of fowls you desire and give them careful attention. Fowls should always have enough, but no more, to eat. It is a great mistake to think you cannot overfeed poultry. Give them as much as they will eat with avidity. Let the birds have plenty of clean water. Give them some variety in their feed. I find it a good plan to feed in the morning with something warm, such as boiled wheat, potatoes, parsnips, &c., with pollard and scraps from the kitchen. It has been stated that feeding with scraps of bread fried in fat keeps them laying through the winter, and as eggs fetch up to 1s. 9d. per dozen at this season this is a very important matter. Much of the profit from fowls is derived from the winter eggs. The fowls should have plenty of room to run about and pick up gravel, lime, &c., which are necessary to their health. When setting a hen, make up a nest of dried ferns and straw rubbed between the hands to soften. Do not put her on the ground, as wet is fatal to the hatching. Put her in a quiet corner, and get her to come off every day to feed. It is a good plan to set two hens on the same day, as when hatched out one can look after both broods, and if the other is kept away she will soon begin to lay again. The young chicks require feeding often, say five or six times a day. I find boiled rice, bread crumbs, canary seed, and curds splendid food for them. When older feed regularly on good solid food, such as corn of various kinds, scraps of meat, and vegetables. At night I give only raw corn. For table purposes meat mixed with vegetable food will increase the fat. To make the flesh white when dressed, feed with corn or rice boiled in skim milk. Of all the breeds I have tried the White Leghorn is my favorite. Since 1890 I have kept nothing but these, and get eggs all the year round. I found the Spanish laid larger eggs, but the chicks are very delicate. I have also found the Andalusian a good layer. Be sure to provide good warm houses, also plenty of shade in the summer. An ash heap for the birds to scratch will aid in keeping them free of vermin. Always remember that thoroughbred poultry pay best.

**VISIT BY FRUIT INSPECTOR.**—Mr. G. Quinn, Inspector of Fruit, visited the district on July 13, and gave demonstrations in budding, grafting, and pruning of fruit trees in several gardens. In the evening he gave an address on Fruit Pests. His visit was greatly appreciated, the attendance at the demonstrations and lecture being good.

### Bute, July 13.

**Present**—Messrs. A. Schroeter (Chairman), J. J. Chapman, S. Lamshed, E. Ebsary, R. C. Commons, W. Sluggett, W. H. Sharman, M. Stevens, J. Birch, H. Schroeter, J. H. Barnes, and D. Green (Hon. Sec.).

**JUDGING STOCK AND IMPLEMENTS.**—The Hon. Secretary called attention to paper read by Mr. J. St. J. Mudge at Pine Forest (see pages 314, 315 of May *Journal*) on judging of stock and implements. Members considered the system outlined very satisfactory, and it was decided to adopt it when possible.

**CABBAGE CATERPILLAR.**—The Hon. Secretary reported that his cabbage and cauliflower plants were attacked by large numbers of small caterpillars. He had tried spraying with soft soap and water without effect. To be referred to Central Bureau. [These are the caterpillars of the cabbage moth (*Plutella cruciferarum*), a widely-spread pest, which does much harm yearly to cabbages and similar plants. When badly attacked very little can be done; in fact, the plants had better be destroyed, so as to kill the caterpillars on them. To be successful it is necessary to treat the plants when the pest makes its first appearance. Boil 1lb. of coal tar in 2galls. of water, by adding the tar very slowly and stirring vigorously; and for use make up to 100galls., using rain-water, being careful to mix it thoroughly. Spray the plants at intervals. Where the caterpillars have been troublesome some recommend that the young

plants should be submerged in a weak decoction of tobacco, to which a little soft soap and tar water has been added. Leave the plants in this for about an hour, rinse in clean water, and then set them out.—GEN. SEC.]

RAINFALL.—Recorded by Mr. Stevens for June, 1·545in. By Mr. Schroeter for June, 1·560in.; for six months, 3·470in.; for July to date, 1·565in.

### Morgan, July 10.

Present—Messrs J. Jackman (Chairman), A. Stubing, G. Roediger, J. Bruhn, and J. Wishart (Hon. Sec.).

CONGRESS.—It was decided to postpone consideration of circular from Central Bureau *re* Ninth Congress to be held during Show week till next meeting.

FOREST TREES.—It was decided to obtain a number of sugar gums, also vines, for planting in the district.

RAINFALL.—For month ending July 10, 1·800in.

### Davenport, July 3.

Present—Messrs W. J. Trembath (Chairman), T. McDowell, J. Holdsworth, J. Fox, T. Tapley, J. Roberts, G. Gelento, and H. Brown (Hon. Sec.).

ANNUAL REPORT.—The Chairman's annual report showed that during the past year twelve meetings were held, with an average attendance of eight members. A visit paid by the Inspector of Fruit (Mr. G. Quinn) was much appreciated. With the Woolundunga Branch a combined meeting was held at Nectar Brook. During the year nine papers were read and discussed. Numerous trials with seeds sent out by the Bureau had been carried out, but the season has been much against experimental work in this direction. The severe drought and consequent depression has greatly interfered with the Branch, but he hoped that in the ensuing year more satisfactory work would be accomplished by the members taking a deeper individual interest in their work. He would like to see a museum and library of agronomical matters generally started, as much benefit would be derived from the same. Messrs. W. J. Trembath and H. Brown were re-elected Chairman and Hon. Sec. respectively for ensuing year, and thanked for their services.

FODDERS.—The Chairman read some extracts from a paper referring to fodder plants. Most of the members were of opinion that in this district greater returns could be obtained from lucern than from any other fodder plant.

### Mount Gambier, July 10.

Present—Messrs J. Umpherston (Chairman), J. Watson, G. G. Collins, J. Bowd, W. Mitchell, J. Dyke, M. C. Wilson, W. Barrows, D. Norman, sen., T. H. Williams (Stock Inspector), J. C. Ruwoldt, and E. Lewis (Hon. Sec.).

OFFICERS.—Messrs. J. Umpherston and E. Lewis were re-elected Chairman and Hon. Sec. for ensuing year.

FRUIT BOARDS.—Considerable discussion took place on the circular from Tanunda Branch *re* amending the Vine, Fruit, and Vegetable Protection Act, in order to provide for the establishment of Fruit Boards, with power to levy rates, appoint inspectors, and do such work as may be necessary to deal with orchard pests in their own districts. Members did not think this system would work in a scattered district like this, and it was decided to inform the Tanunda Branch that they were not disposed to take any action in the matter.

**SEED DRILL.**—Since previous meeting a trial of the "Farmers' Favorite" seed drill was given under the auspices of the Branch. Mr. Mitchell said the drill did its work well, and the results from the use of different manures put in with the seed would be watched with interest. He thought the drill would be found of more benefit on the lighter soils in this district. The Chairman said the drill did its work well, but he thought it might be more profitably used in the north than in this district. If the tines were set too deep the grass turned under in ploughing will be turned up again. Mr. Bowd said if a skim coulter was put on the plough the grass would be put under so well that it would not be brought to the surface by the drill. Mr. Barrows said the skim coulter was of no use in a potato paddock, because the furrows could not be turned over. The Chairman said it would do perfectly in such land as his, and if a skim coulter were used in front and a cutting one behind they would be effective in other soils. Mr. Dyke thought it a mistake to sow some manures with the seed; a strong application of guano would be injurious. Mr. Watson said he did not think they could possibly injure the wheat with guano.

**MOLASSES FOR STOCK.**—The Chairman said he had been feeding his stock on straw and molasses, and found they ate it greedily, and appeared to improve on it. When making the stack the molasses should be mixed with the straw.

**STOCK COMPLAINTS.**—Mr. Williams said there was a danger in feeding stock at the present season of the year on the common thistles growing in the district. There had been a number of deaths lately in the district which were caused by animals in a weak condition eating the thistles and becoming "blown." It was only while the stock were weak and the thistles green and sappy that there was danger.

**SAND IN HORSES.**—Mr. Dyke said he had tried the remedy recommended for sand in horses, viz., giving them yeast and then rolling them from side to side, without effect. He also gave the animal at different times 4ozs. of carbonate of soda, a pint of kerosene, and half a bottle of linseed oil, all of which passed through the horse without doing any good. The animal died, and on being opened he found the stomach and bowel leading to it to be crammed with sand. He had five other animals still affected, and had lost eighteen cows from the same cause, and was afraid as many more would die. Mr. Williams said when the sand was so compacted nothing would act upon it. The true hope of the stockowners was to use plenty of straw and molasses for feeding stock when grass is scarce. Mr. Dyke said he was afraid if he did this now he would find most of them half dead the next morning. Nearly all the cows that had died were within a few weeks of calving, neither steers nor heifers being affected. Mr. Williams said care would of course have to be taken when the stomachs were raw and tender. Weak and pregnant cows succumbed to the complaint first. Mr. Bowd said he cured a cow and a horse badly affected with sand by boiling a few parsnips in water and giving the animals the warm liquid.

### Kadina, July 12.

Present—Messrs. T. M. Rendell (in chair), P. Roach, Thos. Jones, H. F. Johnstone, W. Watts, M. Quinn, C. Whittle, and S. Edyvean (Hon. Sec.)

**JUDGING STOCK AND IMPLEMENTS.**—Mr. Mudge's paper on this subject was discussed. The Hon. Sec. said this idea was not altogether new, as it had been adopted at the field trial at Paskerville. Mr. Roach did not approve of judging by points. They gave no money prizes, and if they published reports in the papers the makers of implements which did not find favor with the

judges would suffer much injury. When they gave big prizes they would be justified in judging in this way. Mr. Quinn said if a maker's machine is not worthy of more points, he deserved to have the result printed. Mr. Jones said the result of such judging would be beneficial to those who were not competent to judge for themselves. The system would prove conclusively which was best. Mr. Johnstone thought the system would do an injustice to the maker by showing up the defects of his articles. A motion was carried, by a small majority, favoring the system.

**LAMBS FOR EXPORT.**—Mr. Roach said outside dairying this was about the best thing farmers could take up, as it was absolutely necessary to do something else than grow wheat. He sent 240 lambs away, nine of which were condemned, owing to bruising, &c. His net return was about 7s. 1d. each. Of his next lot of 125 shorn lambs, two died going down, and thirty were condemned as unsuitable. These netted all round 5s. He was at the Adelaide market the same week, when the price offered was 5s. 3d. in the wool, equal to about 4s. 6d. net, and for shorn lambs he would have only got 3s. 3d. What was required was lambs about 35lbs. weight. He thought Shropshires most profitable. Farmers should cross Merino ewes with Lincoln or Shropshire rams. There was plenty room for improvement in the working of the export establishment. If it could be arranged to slaughter the lambs here and send them by rail in the cool chamber, it would be a great advantage, as lambs sent down alive by rail lost considerably in weight.

### Yankalilla, July 8.

Present—Messrs. G. H. MacMillan (Chairman), J. Tonkin, T. Symonds, J. Butterworth, and F. G. Raymond (Hon. Sec.).

**SEED DRILLS.**—On May 4, a public trial was given of the seed and fertiliser drill introduced into the district by Messrs. MacMillan and Butterworth. The many farmers present were greatly pleased with the satisfactory way in which the drill worked, and the ultimate result is being watched with much interest. Several farmers have put in portions of their crops with the drill, and members reported that these crops were coming on splendidly. In some cases the manure had been shut off for some distance, and the difference between these patches and the manured portions in the same row was already very marked. Mr. Symonds said his plot on very hungry sandy soil was looking splendid.

**MANGOLDS.**—A discussion took place on the value of mangolds for fodder. The Chairman said he had grown them to an enormous size at Normanville. Mr. Butterworth said he dropped some large mangolds about, and the following day found the fowls had cleaned them out and only left a shell. He had stored some until quite dry and apparently useless, but his cows devoured them in preference to any other fodder. The Hon. Sec. said mangolds weighing up to half a hundredweight were grown in the district.

### Eudunda, July 12.

Present—Messrs. F. W. Paech (in chair), G. A. Hilbig, H. D. Wiel, C. Pfeiffer, E. Schier, A. Kluske, and W. H. Marshall (Hon. Sec.).

**EXPERIMENTAL BLOCK.**—It was decided to conduct trial experiments with summer fodders on the Branch experimental block. The Secretary will be glad of seeds of any drought-resisting fodder plants, reports of trials of which will be published. The block is now being fallowed so as to be ready for early sowing.

**DISCUSSION.**—An interesting discussion on rural matters generally ensued.

### Cherry Gardens, July 12.

Present—Messrs. J. Potter (Chairman), J. Lewis, C. Lewis, G. Brumby, J. Jacobs, E. Wright, J. Choate, J. Richards, G. Hicks, W. Nichollic, R. Gibbons, and C. Ricks (Hon. Sec.).

FRUIT BOARDS.—It was decided to support proposed amendment of the Vine, Fruit, and Vegetable Protection Act, members being of opinion that the fruitgrowers themselves were the best persons to see to the carrying out of the Act.

BRANCH BULL.—It was decided to sell the pure-bred Ayrshire bull purchased by the Branch some time since, and to secure another bull to cross with his progeny.

### Mylor, July 10.

Present—Messrs. W. H. Hughes (Chairman), P. Probert, F. Wilson, A. Hampton, W. Nicholl, T. Mundy, R. Mundy, W. T. Elliot, S. Pearce, W. G. Clough (Hon. Sec.), and eleven visitors.

FRUIT BOARDS.—Members did not favor the amendment of the Vine, Fruit, and Vegetable Protection Act, as suggested by Tanunda Branch, as they were of opinion that nothing short of compulsory clauses will be of use in this district.

PAPER.—Mr. Clough read a paper on vitriolised bones, of which the following is the substance:—

Vitriolised bone, or superphosphate, is made in two ways: First, from whole bones crushed up as fine as possible; or from bonedust as obtained from the merchants. Mr. John Brock, of New Mecklenburg, gives me the following particulars of his method of treating the bones:—Fill a cement or leaden trough with bones broken up small. Add one part of sulphuric acid to two of water, and pour carefully over the bones, letting them remain until they appear like cream. Take out this and allow it to dry, then pound up as fine as possible and mix with wood ashes, earth, or rotten manure, and you have a high-class fertiliser. Wood ashes are best, as they destroy any injurious effect of the acid. Bonedust is better to treat, as it is less trouble. I used about 1 ton of sulphuric acid to about 20 tons of bonedust, which gave a very satisfactory return. I put a few inches of loose earth on the floor, then make a heap of five or ten bags of bonedust; moisten with water, stirring with a shovel until the heap is thoroughly damped; then add 1 gull of sulphuric acid to 2 galls. of water in a wooden tub, and sprinkle the heap, stirring thoroughly; throw some fine earth over the heap, and leave for two or three weeks, or until required, then sift it. One hundredweight per acre sown with the drill is a good dressing, though I put 2 cwt. or 3 cwt. on poor soil. Be very careful to wear old clothes and boots, as the acid is very destructive. [It is desirable to use a watering-pot and rose made of lead for sprinkling the mixture of sulphuric acid and water.—Gen. Sec.] Bonedust alone does not answer for potatoes on poor land; farmyard manure, well rotted, is also required, and should be worked into the soil as long as possible before planting. Then run the phosphate in the furrows with the setts. Manuring with phosphate gives a fine sample on even poor land, and will double the yield of corn. I have been using guano, bonedust, superphosphate, &c., for over forty years, and would strongly advise all farmers to feed their land as well as their cattle. A good clay floor will do probably better than a cement one. Forty pounds of sulphuric acid will dissolve 1 cwt. of bones, to which about 3 cwt. of wood ashes should be added, making above 4 cwt. of fertiliser. The cost will be: For sulphuric acid, 14s. 6d.; bones, 2s. 6d.; total, 17s. Professor Lowrie gives the following as an average analysis of vitriolised bones, or bone superphosphate:—8.5 per cent. of soluble phosphoric acid, 7.5 per cent. insoluble phosphoric acid, 2.5 per cent. nitrogen. He also gives the value of the first as 5s. 9d. per unit, the second 3s. 3d., and the third at 11s. 6d., making the value of the manure as follows:— $6.75 \times 8.5$  for soluble phosphoric acid, £2 8s. 10d.;  $3.25 \times 7.5$  insoluble phosphoric acid, £1 4s. 4d.;  $11.5 \times 2.5$  nitrogen, £1 8s. 9d.; total, £5 1s. 11d. The Professor gives the following values of different manures:—Mineral superphosphate, or, as it is generally designated, superphosphate,  $5.6 \times 13$  per cent. soluble phosphoric acid, £3 11s. 6d.; basic slag, £3 10s.; phosphate guano, £3 14s. 6d.; superphosphated guano, £3 8s. 10d. Generally of phosphatic manures, vitriolised bones has given the best results. In most of the Experiment Station [? U.S.A.—Gen. Sec.]

reports it heads the list. At four stations the yield of the plot manured with vitriolised bones averaged with turnips 24 tons 16cwt. per acre, 2cwt. more than Thomas's Phosphate Powder, 3cwt. more than superphosphate, 25cwt. more than steamed bones, 36½cwt. more than Australian guano, 49½cwt. more than bone-meal, 67½cwt. more than the unmanured check plots.

### Naracoorte, July 10.

Present—Messrs. O. Hunt (Chairman), H. Smith, S. Schinckel, J. Wynes, H. Buck, and A. Limbert

**GREEN CROPS.**—Mr. Buck said the barley crops for green feed have not done so well as last year. Mustard seems to stand the dry weather better, being 3ft. to 4ft. high, and out in flower. He usually cut it before flowering, so as to get a second crop, but this year the dry weather forced it into flower too quickly. Turnips are doing well, also peas. Mr. Wynes said for green feed it would be better to put in rye, as this did well in sand. Mr. Buck said stock took to barley better. The Chairman said vetches made good food for stock.

**PAPER.**—The Chairman read the following paper on "Pruning of Fruit Trees":—

This is a very difficult subject to write about, as there has been so much written on pruning, and so many various ways recommended as the best. It is like religion, each one brings forward something to prove his method is the best. I am not going to say that my way is the best, but having grown fruit fairly successfully and practised pruning for a number of years, I venture to offer you a few remarks on my usual mode of doing it. Beginning with trees just planted, cut out any surplus wood and start the crown with two or more shoots; you should leave three or four if available. Presuming they are fairly grown trees of two years old, cut back the shoots to about 6in., and if they do fairly well they will make 18in. or 2ft. of growth; in the second year cut back again from 8in. to 12in., according to the growth made. Strong growth can be left the greatest length, keeping the centre part of the tree full and a little higher than the outside. In the third year cut back again to 10in or 12in., any short shoots that have grown on any two previous years' wood cut back to 2in. or 3in. to form fruit spurs; also, when from the last cut there is more wood than is required to form the tree, prune back as above to form fruit spurs. Now from this onward prune according to the growth made, but it is not advisable to leave much over a foot of wood until the trees have good stout stems to carry the tops and the fruit. I prune to keep the middle part of the tree full and something of the shape on top of an open umbrella, otherwise when the trees bear heavy crops of fruit the branches are borne down and the centre of the tree becomes exposed to the sun, which often does great injury by burning the bark and fruit. These remarks apply principally to apples and pears. If the trees are inclined to run to wood and not fruit they should be summer pruned, or better, pinched back on all the spur shoots as soon as they get 2in. or 3in. long; also all low outside shoots, when not wanted to form the tree, by pinching the young growth on spurs, and not the leading shoots, as it causes them to form fruit-buds where the tree is best able to carry the fruit, and the wind does not affect it. As the peach is generally of much stronger growth, treat them the same as former trees when planted. The second year you can allow more length, say 18ins. After that the peach begins to bear. When I cut for fruit I cut according to sorts, leaving a few fruit-buds on the main shoots, and tip laterals back to a few fruit-buds, leaving as much as the tree can reasonably carry. With sorts that only blossom near the tips, leave some laterals full length to bear, and cut some back to form wood for next year. Almost the same remarks apply to apricots. I find it best after the second year to pinch back shoots to make laterals close in, as if left they grow too long before they branch out, and have to be cut away or become top-heavy and throw their fruit off, as they mostly bear on small twigs or later growths. I would advise beginners in growing apricots to take particular notice of the wood that flowers the best and sets its fruit. I find the strong shoots seldom bear any fruit; buds mostly fall out. My idea of pruning is to form the tree as I wish, and to make two shoots grow strong where only one grew before, and to cause fruit to grow on the spurs instead of on long whipping branches. His experience was certainly against the statement of Mr. von Usler, of Hanover, quoted by the Chairman of the Central Bureau, to the effect that it was a mistake to believe that trees must be pruned, and that pruning was injurious.

**POTATOES.**—In reply to question by Mr. Limbert, Beauty of Hebron and Pink Flower Ball were suggested as the best potatoes for an early crop.

**Port Pirie, July 13.**

Present—Messrs. G. Robertson (Chairman), J. Lawrie, G. Hannan, G. Wright, E. Stevens, S. Webster, R. F. Humphris, P. J. Spain, T. Gambrell, W. K. Mallyon, and R. M. Bertram (Hon. Sec.).

**FIELD TRIALS.**—Crystal Brook Branch wrote asking that delegates should be appointed by this Branch to meet delegates from Redhill, Narridy, Gladstone, and Crystal Brook Branches, to consider details of proposed field trial society. Members were strongly in favor of co-operating with the Branches mentioned, and delegates were appointed.

**Mount Pleasant, July 9.**

Present—Messrs. G. Phillis (Chairman), F. Thomson, J. F. Miller, P. Miller, jun., J. Maxwell, and H. A. Giles.

**CONGRESS.**—Members suggested as a suitable subject for discussion at Congress the need of a cheap and simple travelling press for pressing straw in the paddocks into bales of about 2cwt., for convenience in carting, building shelters for stock, sides to sheds, &c. They considered such a press a matter of necessity, and thought the Royal Agricultural Society would do well to offer a prize for same. The members also think it necessary that the Branches should, through their individual members, impress on their neighbors the advisableness of always storing any available food for stock, either for winter use or for use in seasons of drought.

**FRUIT BOARDS.**—Members did not care to express an opinion on the question of the establishment of fruit boards, not being sufficiently interested in fruit-growing.

**Nantawarra, July 12.**

Present—Messrs. S. Sleep (Chairman), R. Uphill, A. L. Greenshields, J. Nicholls, A. F. Herbert, E. Pridham, C. Belling, and T. Dixon, jun. (Hon. Sec.).

**SEED EXPERIMENTS.**—Members reported complete failure, owing to the drought, of experiments with seeds distributed by the Central Bureau.

**FEED FOR STOCK.**—Members agreed that had they taken a little more trouble in conserving cocky chaff and straw they could have kept their stock in better condition during the past severe season. They were of opinion that most stockowners would benefit by the severe lesson they have received. In reply to Mr. Nicholls, Mr. Belling stated he had been using oats in the place of crushed wheat for his horses, and found they derived great benefit from the change; their shoulders were more free from sores, and they did not sweat so much. Mr. Nicholls said he had been growing oats for several years, and although some sorts did not make good hay, being too coarse and bitter, when fed as grain he found his horses did better work than on boiled wheat. Other members had had similar experience.

**SORE SHOULDERS.**—Mr. Greenshields found that lining the collar with sheepskin, wool side out, was a good preventive of sore shoulders. Mr. Belling said a wheat bag folded about 4in. or 5in. wide, with a hook on each end, and a strap to go across the horse's neck with a buckle so as to adjust it to fit the horse, was a good substitute for a collar if the shoulders are sore, as it will allow the sores to heal. He would not recommend it, however, for continuous work.



### Pyap, June 30.

Present—Messrs. C. Billett (Chairman), T. Teale, G. Clarke, W. Axon, F. Muirhead, K. F. Huselius, E. Robinson, B. T. H. Cox, A. J. Brocklehurst, J. Harrington, H. Mills, and W. C. Rodgers (Hon. Sec.).

CHAIRMAN.—Mr. K. F. Huselius was elected Chairman for ensuing year.

LEMONS AND SCALES.—Mr. Clarke reported that the young shoots on the lemon trees had been injured by severe frosts. He had sprayed the trees affected by brown scale twice with resin wash, and found it successful. He had also used it, as an experiment, with success on the native scales on the mallee.

SEED EXPERIMENTS.—Several reports on growth of plants from Bureau seeds were received. Mr. Teale spoke very highly of the Preserving Melon for culinary purposes, being one of the best and most profitable.

### Clinton Centre, July 9.

Present—Messrs. R. A. Montgomery (Chairman), F. Illman, G. Mason, J. Phelps, T. Tec, and J. L. Broadbent (Hon. Sec.).

OFFICERS.—Messrs. R. A. Montgomery and J. L. Broadbent were re-elected Chairman and Hon. Sec. respectively for ensuing year, and a vote of thanks was accorded to the Chairman and Mrs. Montgomery for their hospitality in accommodating the members during the past year.

SALE OF COMMERCIAL FERTILISERS.—Mr. Phelps inquired whether any legislation had been passed providing for a standard for artificial manures. Members were of opinion that the Branch Bureaus should combine to force all sellers of such fertilisers to give a guaranteed analysis with every parcel sold. They also thought an inspector should be appointed to see that there was no fraud on the part of the sellers. [The Fertilisers Act provides that every manufactured fertiliser must be sold with a guaranteed analysis (see notice in present issue), and buyers should insist on the seller giving them such analysis.

—GEN. SEC.]

### Petersburg, July 3.

Present—Messrs. W. Miller (Chairman), R. McPherson, A. Dowd, T. Selby, R. Cochrane, F. W. Sambell, W. Waters, W. Heithersay, A. W. Jamieson, and J. Wilson (Hon. Sec.).

ANNUAL REPORT.—The Chairman's annual report showed that during the year eight meetings were held, with an average attendance of over eight members. The severity of the season had greatly hampered the work of the Branch. The rainfall for the past twelve months was the lowest on record, viz., 5.115in., at his residence, of which 1.360in. fell during the past two weeks; 5.340in. at Mr. Dowd's; and 6.585in. at Petersburg township. In the early part of the year the question of purchasing a seed and manure drill, with the object of practically testing the advantage or otherwise of using the machine in this district, was considered, but owing to the drought the project fell through. Later on, however, ten acres on Mr. Selby's farm was put in with the drill, at a cost of £3 10s., to test the matter. A little experimenting was done during the year with fertilisers, Mr. McPherson reporting favorably on results obtained by using Conrad's blood manure. The experiment with flax conducted by Mr. McGeough under the auspices of the Branch was a failure, but probably with an ordinary season it could be profitably grown. The crops were a complete failure, no hay being cut, and less wheat reaped

than was sown. Cattle have died in great numbers, and, but for the action of the Branch in arranging to send working horses to the northern pastures, the loss here would have been very heavy. The Chairman and Hon. Sec. were re-elected for ensuing year, and thanked for past services. The balance-sheet showed that £16 11s. 11d. was raised for the Branch Bureau work, and after necessary payments had been made there was left a balance to credit of £1 1s. 6d.

**BRANCH BULL.**—Mr. Cochrane, who has had charge of the pure-bred Ayrshire bull belonging to the Branch, reported that in the early part of the season his services were fairly well availed of by blockers and farmers, but owing to the drought and consequent difficulty of keeping cows no one wished to increase their numbers; consequently the bull was not well patronised during the past six months. Unfortunately some of the cows and calves have died, but generally the half-breed stock has proved hardier than the common cows. Ten cows belonging to members and eleven to outsiders were served by the bull, while the number of his calves dropped during the year was twenty-one, thirteen being heifers and eight bulls. This brings the number since the introduction of the bull to 126, seventy of which were heifers.

### Calca, July 3.

**Present**—Messrs. T. P. Cash (Chairman), J. Bowman, A. Plush, A. Newbold, D. C. Drever, J. E. Dinsdale, D. P. Thomas, W. Wilcott, and A. B. Smith (Hon. Sec.).

**ANNUAL MEETING.**—Messrs. Jas. Bowman, W. Wilcott, and D. P. Thomas were elected Chairman, Vice-chairman, and Hon. Sec. respectively for ensuing year. It was decided that each member should in turn prepare a paper for discussion.

### Balaklava, July 17.

**Present**—Messrs. C. L. Reuter (Chairman), W. H. Sires, J. Mills, E. Roberts, A. Manley, G. Reid, J. Willmott, and E. M. Sage (Hon. Sec.).

**OFFICERS.**—Messrs. C. L. Reuter and E. M. Sage were re-elected Chairman and Hon. Sec. for ensuing year.

**PAPER.**—Mr. Sage read a paper on "Pruning of Stone Fruits," as follows:—

The apricot and plum require much the same treatment, as they both form what may be called permanent fruit spurs that will bear fruit as long as the tree lives. The first year after planting I cut back to 6in. or so, according to growth, and for the next three years prune back about half the length of growth, or in the apricot short enough to cut away the bunch of fruit spurs formed during the season which we call the crown, as I find that the fruit set on these spurs is small, and I am apt to get a length of wood underneath the next season without any permanent spurs. The closer and more compact we can keep trees, and the less useless length of limb, the better, as evaporation goes on from the whole surface in a greater or less degree, and we have no moisture to spare. I have seen trees with lengths of 2ft. on the limbs with scarcely a fruit spur. Cut back any shoots, except the leading ones, as short as 3in., taking care to prune to a growth bud, and not a bunch of blossom or very likely the shoot will die off; some, of course, must be cut out altogether, or they will be too crowded. I think it is best to pinch back all shoots, except the ones wanted for main limbs, when they are about 3in. long, so as to cause them to branch and form fruit spurs at once; they may be pinched back several times, if needed, during the summer. I leave more leading shoots than I require to form the tree to allow for accidents, and these I do not touch during the growing season, as I believe excessive summer pruning in our dry climate would soon stunt a tree. After the apricot and plum are five or six years old, I cut back the leading shoots to 6in. or 9in. The fruit spurs in the body of a tree do not need touching until a tree is a good age; then it may be advisable to cut away some parts of them to strengthen the rest.

The peach and nectarine require different treatment, as they do not form permanent fruit spurs, but bear fruit on wood of the previous season's growth. The fruit spurs, if such they may be called, only last for a year or two, when they must be cut right out, and young ones forced out to take their place. When the trees are young they do not need hard pruning, especially if they grow vigorously, as the fruit buds are nearly always near the ends of the growths, and if you prune hard you cut off your crop, and only induce a rank growth again the next season. I only prune a young tree sufficiently to shape it, and I believe it is better to thin the fruit on a young tree if it sets too thickly, rather than to prune hard. Peaches and nectarines may be thinned when they are quite small, as they are not so liable to fall off during stoning as apricots often do. After about the fourth year the trees will not make so much wood, and then you have more control over them. When a spur has borne fruit two seasons, I cut it clean away, and the next season a fresh one will take its place. If you leave it to die a natural death, it is very likely no fresh one grows. Every twig on a five or six year old peach has to be examined right from the bottom of the main limbs upwards. Three fruit buds on each shoot is quite sufficient. One has to be very careful with peaches, not to prune to a blossom bud in place of a growth bud. I like if I can to cut back to one of the large double buds, as they will throw out a stronger shoot for next season than the others. The closer back to the main limbs you can get your fruit the better it will be, both as regards size and flavor. The peach requires careful treatment on the lower part of the tree will become bare, with just a bunch of fruit wood at the top. The same treatment applies to the nectarine.

A good discussion followed. Mr. Roberts wished to know the cause of a tree gumming just beneath the soil, and how to treat the same. Mr. Sires said that after clearing the soil from round the tree he swabbed the place with Bordeaux mixture and stopped the gumming.

### Lyrup, July 15.

Present—Messrs. A. Pomeroy (Chairman), T. Nolan, E. J. Dwyer, C. J. Egan, F. E. Chick, A. Thornt, D. Thayne, T. R. Brown, R. S. Cheek, W. H. Walling, and W. H. Wilson (Hon. Sec.).

**FRUIT BOARDS.**—Members were of opinion that the amendments to the Vine, Fruit, and Vegetable Protection Act, as proposed by Tanunda Branch, would improve the Act, and render it more workable. They did not consider it was likely that in the event of local fruit boards being established it would ever be necessary to levy as much as 4s. per acre per annum on the orchards. It was resolved that this Branch supports the Tanunda Branch in their action.

### Minlaton, July 17.

Present—Messrs. J. Martin (Chairman), R. Higgins, M. Twartz, J. Anderson, J. McKenzie, J. Bennett, H. Boundy, S. Vanstone, D. G. Teichelmann, and J. Correll (Hon. Sec.).

**BUNT IN WHEAT.**—Mr. Vanstone tabled samples of wheat in the straw to show the benefit of pickling with bluestone. Last season he rubbed a number of bunt balls with good grain, pickled portion, and sowed some unpickled at the same time. At harvest the crop from the pickled seed was quite free from bunt, while of the unpickled nearly all was affected. With one exception, members agreed that bunted grain should be pickled before sowing.

**MARRHAM GRASS.**—Mr. Twartz said this valuable sand-binding plant was spreading in the sandhills along the Minlacowie beach, and a large quantity of seeds and plants could be obtained at the right season. Mr. Boundy agreed, and said the milch cows eat the young growth readily and gave milk freely on it.

**EXPERIMENTAL PLOTS.**—The Hon. Secretary said he had set apart about one acre for experimenting with grasses, wheats, and other grains. The plot had been manured with about 2cwts. of Thomas's phosphate and  $\frac{1}{4}$ cwt. of muriate of potash. He was also trying experiments with oats, to see whether the soil was deficient in potash. On one plot of about  $1\frac{1}{2}$  acre he used 100lbs. kainit, 112lbs. Thomas's phosphate, and 10lbs. nitrate of soda. On another plot of an acre in extent he used same quantity of kainit and phosphate, without the nitrate: while on a third plot he used 112lbs. Thomas's phosphate only.

### Kanmantoo, July 16.

**Present**—Messrs. J. Downing (in chair), J. Mullins, E. Downing, Thos. Hawthorne, T. Hair, F. Lehmann, A. Hair, W. G. Mills (Hon. Sec.), and one visitor.

**FRUIT BOARDS.**—The proposed amendment of the Vine, Fruit, and Vegetable Protection Act was considered, and the following resolutions carried:—

- (1) "That it is very desirable that boards should be appointed, with power to act as proposed, and that all the settled parts of the colony should be included."
- (2) "That all gardens, whether large or small, should be rated, as otherwise the Act would be useless, as a single neglected tree in an allotment was sufficient to re-infect a whole district." It was pointed out that the codlin moth was distributed by hawkers, &c., with infected fruit and boxes in which infected fruit had been packed, and that honorary inspectors did not like to interfere, but if each district had its paid inspector it would be different.

**TAILING LAMBS.**—In reply to question by Mr. Lehmann, members advised tailing the lambs when they were about a month old.

### Mount Compass, July 13.

**Present**—Messrs. J. Youlton (Chairman), S. Athurs, W. Gowling, C. S. Hancock, A. J. Hancock, R. Peters, M. Jacobs, F. Slater, W. Wright, H. McKinlay (Hon. Sec.), and four visitors.

**BUREAU SEEDS.**—Mr. Wright tabled samples of Bullock Heart Cabbage from Bureau seeds. They were of good shape and well filled out, but, owing to the lateness of the season, were not large. He also tabled Purple-top Turnip of the ordinary kind, but weighing 19 $\frac{1}{2}$ lbs.; it was grown on new land without manure, except the ashes left from a recent burning. The Hon. Secretary reported that during the year a number of seeds received from Central Bureau had been tried, generally with satisfactory results, and, judging from the samples tabled at the meetings, they were what they were represented to be, both as regards size and quality.

**CONGRESS.**—Members expressed a wish to have the subject of "Manuring of Vegetables" discussed at the forthcoming Congress, on September 8 and 9.

**ANNUAL REPORT**—The Hon. Sec.'s report showed that since the formation of the Branch, in November last, eight meetings had been held, with an average attendance of nine members out of a total of thirteen. Several members had read practical papers, and not only had the members themselves, but the whole district, had distinctly benefited from the work of the Branch. Messrs. J. Youlton and H. McKinlay were re-elected Chairman and Hon. Sec., and Mr. T. Chaplain elected Vice-chairman.

### Richman's Creek, July 12.

Present—Messrs. W. Freebairn (Chairman), A. Knauerhase, P. J. O'Donohue, J. McSkimming, J. J. Gebert, and J. McColl (Hon. Sec.).

CONGRESS.—Members were of opinion that at least two railway passes should be granted to each Branch, to allow of them sending representatives to the annual Congress to be held on September 8 and 9.

SEASON. - Members reported that the wheat crops had come up well, and were now making good progress. Mr. O'Donohue said he had sown a small quantity of Allora and Steinwedel wheat side by side, and found the former was growing much faster.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the year seven meetings were held, the average attendance being over eight. The severe season has considerably interfered both with the attendance and interest of the meetings, but with a promising fall of rain he hoped for better results this year. Messrs. W. Freebairn and J. McColl were re-elected Chairman and Hon. Sec. for ensuing year.

CULTIVATION OF SALTBUSH.—The Hon. Secretary referred to the necessity for cultivating and protecting saltbushes and other indigenous fodders. The recent severe and costly experience they had had gave the subject a real live interest to stockholders, and he considered the determination of members to carry out some practical experiments in the cultivation of saltbushes a really wise one.

RAINFALL.—Recorded by the Chairman for June, 1'485in.; total for six months 2'480in.; for July to date, 0'940in. By Messrs. McColl for June, 1'345in.; six months, 2'925in.; July to date, 1'560in.

### Redhill, July 12.

Present—Messrs. F. Wheaton (Chairman), A. A. Robertson, H. Darwin, G. Wheaton, A. Stone, R. B. P. Bailey, and T. McDonald (Hon. Sec.).

NOXIOUS WEEDS.—Mr. Bailey read a paper on "Noxious Weeds." He contended that the present Act was faulty and unworkable. Members agreed that the Bathurst bur and star thistle were the only really noxious weeds in this district. They considered the Act in regard to these two should be strictly enforced. The members also thought the Act should be amended. [In what direction?—GEN. SEC.]

### Woodside, July 12.

Present—Messrs. R. W. Kleinschmidt (in chair), J. Cuthbertson, A. Pfeiffer, J. Caldwell, jun., J. H. Snell, E. Esau, A. S. Hughes, C. W. Fowler, and G. F. Lauterbach (Hon. Sec.).

VISIT TO HOMESTEAD.—On June 5 a meeting was held at Mr. E. Esau's farm for the purpose of witnessing "The Farmers' Favorite" seed and manure drill at work. Members were greatly pleased with the machine, and considered one of the greatest advantages derived from the use of the drill was that the manures were used economically and to the best advantage.

TREATMENT OF SEED WHEAT.—A paper on "Treatment of Wheat for Seeding," prepared by Mr. J. Hutchens, was read, and discussion ensued as to the necessity for pickling wheat. Some members said that pickling with bluestone was injurious, and thought washing the seed in pure water would

prevent bunt. The majority, however, favored pickling with bluestone, using about  $\frac{3}{4}$  lb. to the bag of wheat. Further discussion on paper postponed till March meeting.

**BRANCH BULL.**—The question of purchasing a pure-bred bull of approved dairy breed, with a view to improving the herds of the district, has been under consideration for some time, but as several of the residents have already secured well-bred bulls, nothing definite was done.

**FRUIT BOARDS.**—Members were not in favor of the proposed amendment of the Vine, Fruit, and Vegetable Protection Act.

### Gawler River, July 15.

Present—Messrs. A. M. Dawkins (Chairman), J. Badman, J. Hillier, A. Bray, T. P. Parker, H. Heaslip, E. Dawkins, F. Roediger, G. Johnston, C. Ayling, C. S. McLean, J. Bushbridge, R. Badcock, H. Roediger (Hon. Sec.), and one visitor.

**FRUIT BOARDS.**—Members approved of proposed alteration in the Vine, Fruit, and Vegetable Protection Act.

**"HEADED" WHEAT FOR SEED.**—Mr. E. Dawkins initiated discussion on the use of the "header." He was very well satisfied with its work, and intends using it, especially on wheat intended for seed. Mr. Parker also favored thrashing seed wheat with the disc header, as he has found that the crop comes up thicker than from grain reaped with the stripper.

**LUCERN.**—Mr. Headlip asked when was the best time to sow lucern. Some members thought it best to sow in April or May, so as to get it well established before the hot weather sets in, but others considered September the best time to sow. Mr. Parker said he knew of a case where the seed was sown with a cereal crop, and when the latter was taken off the lucern made good progress. The Chairman said in his opinion land for lucern should lay fallow for two years, and be well worked in order to destroy the weeds before sowing. Mr. Badman advocated subsoiling land intended for lucern.

### Port Broughton, July 19.

Present—Messrs. G. Pattingdale (Chairman), W. Bennier, H. M. Peel, J. Harford, J. Barclay, B. Excell, R. W. Bawden, R. Dennis, I. Rayson, R. Storr, W. R. Whittaker; and S. M. Bawden (Hon. Sec.)

**OFFICERS.**—Messrs. R. W. Bawden and S. M. Bawden were elected Chairman and Hon. Sec. for ensuing year.

**DRAUGHT STALLION.**—Mundoora Branch wrote that owing to the bad season, and the low condition of stock, they could not see their way to co-operate to secure the services of a first class draught stallion. It was decided to let the matter stand over for six months.

**DRILLING AND MANURES.**—Owing to one of the members having purchased a seed and fertiliser drill a number of farmers have had small areas put in with it as an experiment, and several tons of manure, principally superphosphate and Thomas's phosphate, have been used.

**EMERGENCY FODDER.**—Owing to the scarcity of feed in this district, it has been a difficult matter to find food for stock. Some farmers who had straw stacks have used the chopped straw mixed with molasses, and speak very highly of the results.

**CATTLE COMPLAINT.**—The complaint amongst cattle causing stiffness in the limbs and weakness is very prevalent in this district, and several farmers have lost cattle.

### **Murray Bridge, July 10.**

**Present**—Messrs. F. H. Wurm (Chairman), W. Lehmann, J. J. Stecker, W. Schubert, J. G. Jaensch, H. Block, J. A. Moore, B. Bretag, B. Jaensch, R. Edwards (Hon. Sec.), G. Quinn (Inspector of Fruit), and twenty visitors.

**LECTURE AND DEMONSTRATION.**—During the day Mr. Quinn visited a number of gardens in the district, and gave practical illustrations in the pruning of fruit-trees. He expressed surprise at the growth of the trees and at the quality of the lemons, which were equal to those grown in the most favored districts in the colony. With a supply of water the country round here would be of great value for higher cultivation. In the evening he gave an interesting address on pruning, with blackboard illustrations, and on insect and fungus pests.

### **Stockport, July 19.**

**Present**—Messrs. F. Watts (Chairman), C. W. Smith, D. G. Stribling, M. Connolly, P. Hogan, T. Megaw, J. Smith, J. Smith, jun., S. Rodgers, J. Murray (Hon. Sec.), and five visitors.

**CONGRESS.**—Members would like to have the subject of "Agricultural Science Classes" discussed at Congress, and will prepare a paper on the subject.

**MANURES.**—Mr. C. W. Smith read a paper on "Does it pay to use artificial manures." He said this depended mainly on two things, viz., the season and the price of produce. A fairly good season was at any time required to make manuring profitable, but with wheat below 2s. per bushel he did not see how it could possibly pay. Then the price and constituents of the manures had to be considered. Taking Kangaroo Island guano, bonedust, and Thomas's phosphate, these cost per ton at Stockport station respectively £2 6s. 6d., £4 14s., and £4 9s. The two latter would give better results per ton than Kangaroo Island guano, but the latter gave a larger profit on the cost. Discussion postponed till next meeting. It was decided to ask the Central Bureau to recommend, when the next season comes round, the most suitable manure for general use. [It is impossible for the Central Bureau to do this, as not only is one manure better than another for a certain plant, but the soil and climate also make a difference. In the Eighth Congress report, Professor Lowrie shows how each can estimate for himself the value of manures according to analysis, which the seller is required by law to furnish with every parcel of manure sold by him.—GEN. SEC.]

### **Arden Vale, July 19.**

**Present**—Messrs. A. Hanneman (Chairman), M. Eckert, F. Schuttloffel, and L. E. Warren.

**PAPER.**—Mr. Hannemann read an interesting account of his visit to Cooper's Creek with sheep and horses, also to the Kopperamanna bore and the Lutheran Mission Station.

**RAINFALL.**—Recorded by the chairman for six months ending June 30, 4'390in.; July to date, 1'260in.; by Mr. Eckert for six months, 4'670in.; July to date, 1'650in.

**Hartley, July 16.**

Present—Messrs. J. Stanton (in chair), G. Jaensch, T. Jaensch, H. Reimers, C. Harvey, W. Klenke, A. Thiele, A. Wundersitz, and J. Ferris.

POTATOES. — An interesting discussion took place on a paper read by the chairman on potatoes. The members were of opinion that the "Pinkeye" was the best allround potato in this district.

**Clarendon, July 8.**

Present—Messrs. James Wright (Chairman), A. Harper, C. Hicks, J. Juers, J. Chapman, W. Spencer, A. A. Harper, W. A. Morphet, J. Piggot, J. Spencer, and A. L. Morphet (Hon. Sec.).

FRUIT BOARDS — Members strongly support the proposed amendment of the Vine, Fruit, and Vegetable Protection Act, and expressed the hope that the same would become law at an early date.

"IGUANAS" AS RABBIT DESTROYERS.—Mr. Piggot called attention to the value of the so-called iguana as a destroyer of rabbits, and he thought they should be protected by law. He knew of a paddock that had been completely cleared of rabbits by these reptiles, and asked whether they usually attacked rabbits.

PAPER.—Mr. Chapman read a short paper on "Rearing Calves." He did not think it paid for persons with small holdings to rear them, as a good cow could generally be purchased as cheap as the calf could be raised. It was a general practice to tie the calves to the fences. This simply trained them as fence breakers, as they are always trying to get through, and once a wire is broken, probably the cow will find it out, and she too will try to break through, often destroying the post in doing so. He found bluegum better timber for posts than redgum, as the latter, is too brittle and apt to break off if a beast goes against them.

**Penola, July 17.**

Present—Messrs. D. McKay (Chairman), E. A. Stoney, W. Miller, J. W. Sandiford, D. Balnaves, A. Cameron, Dr. Ockley, and T. H. Artaud (Hon. Sec.).

RAINFALL.—For six months ending June 30, at Penola, 8.850in. : at Fruit Colony, 7.300in.

FRUIT BOARDS.—The proposed amendment of the Vine, Fruit, and Vegetable Protection Act was considered, but it was decided to refer the matter to the members of the Fruit Colonists Association, who are personally interested.

LIME IN THE SOIL.—The Chairman said he had read of a very simple way of testing whether a soil had sufficient lime in it. It was to well dry and pulverise a few ounces of the soil, then burn to ashes on a shovel; cool the ashes, mix with water to a thick paste, and then stir in one ounce of muriatic acid (spirits of salts). If there is a brisk effervescence, there is sufficient lime; if not, the soil is deficient in lime. In mixing the ashes and acid nothing metallic should be used.

**Onetree Hill, July 16.**

Present—Messrs. J. Bowman (Chairman), F. L. Ifould, A. Thomas, J. Flower, A. Adams, E. A. Kelly, F. Bowman, H. H. Blackham, J. S. Harvey, and Geo. Bowman.



**VISIT TO KINGSFORD.**—It was decided to accept invitation from the manager of Mr. J. H. Angas's Kingsford Station for members of the Branch to visit the station and inspect the stock.

**SHEEP.**—Mr. Thomas answered a number of questions concerning the management of sheep.

### Mundoora, July 9.

**Present**—Messrs. J. Blake (Chairman), W. Atkinson, W. D. Tonkin, W. Aitchison, N. J. Francis, W. J. Shearer, A. E. Gardiner (Hon. Sec.), and one visitor.

**IMPROVEMENT OF HORSE STOCK.**—Owing to the scarcity of food and the low condition of mares, it was decided that it would not be advisable to co-operate with Pine Forest and Port Broughton Branches in securing the services of a good draught stallion to travel the district.

**SHEEP.**—The Chairman called attention to account in the *Garden and Field* for July of successful breeding of Shropshire sheep by Mr. G. A. Maidment, of Hindmarsh Island, and a long discussion followed. Mr. Aitchison said he did not see why these sheep should not do well in this district, but the land must not be too heavily stocked. The Chairman and other members concurred. Mr. Tonkin strongly favored the Merino for this district. He had always done well with them, and found very little trouble in getting them ready for market; they were also easily kept in the paddocks.

**TANNING RABBIT SKINS.**—Members wished to know how to tan rabbit and other small skins with the fur on. [Peg the skins out, clean off blood, flesh, and loose skin, and, after damping lightly, if not already damp, sprinkle with equal parts common salt and burnt alum.—GEN. SEC.]

### Boothby, July 13.

**Present**—Messrs. J. T. Whyte (Chairman), J. Sellhorn, E. Bradley, A. Turnbull, J. A. Foulds, H. S. Robinson, J. Bell, G. T. Way, T. Sims, G. Wheeler (Hon. Sec.), and a number of visitors.

**HOMESTEAD MEETING.**—This meeting was held at Mr. T. Sims's residence, on the Yeldulknie Creek, members being accompanied by their wives and friends. The members inspected the farm buildings, yards, &c., and were afterwards entertained by Mr. and Mrs. Sims.

**WILD DOG PEST.**—Mr. McKenzie introduced this question. The pest was every day becoming more serious, and unless something were done soon they would have to give up keeping sheep. He strongly favored the scheme for a vermin-proof fence along the north boundaries of the counties of Jervois and Musgrave, to reach from Spencer's Gulf to the West Coast. Then with a fair price offered for scalps, raised by taxing all land inside the fence, they would have a prospect of coping with the dogs. Mr. Foulds opposed this as a wheat-grower. To him the dogs were really a benefit, as they destroyed great numbers of rabbits, and he certainly did not want to pay towards killing them. The members generally favored the scheme as the solution of a very serious difficulty.

**FARMERS' UNION.**—A good discussion took place on the advisableness of joining the S.A. Farmers Co-operative Union and getting a branch established in this district, and a resolution in favor of this was carried unanimously.

**POULTRY.**—Mr. R. Chaplin forwarded a paper on "Poultry." He favored crossing the pure breeds, with frequent introduction of new blood, otherwise the

birds will soon deteriorate. For good table birds the pure-bred Game rooster crossed with Dorkings was very good. It is as cheap to keep good fowls as bad, and more profitable. Mr. Turnbull thought a haystack the best thing to make hens lay; there was a very great deal in the feeding. As layers, he advocated a cross between the Light Brahma and Black Spanish. Mr. McKenzie wished to know best winter layers. He had obtained choice birds and fed them well, but failed to get eggs. The Hon. Secretary said he found drake one of the best of feeds for egg-producing during winter months. ["Drake" or "darnel" is generally considered to be poisonous unless boiled and drained of the water afterwards.—GEN. SEC.]

PAPER.—Mr. Way read a paper on "The Best Horse for the District," of which the following is the substance:—

No one will deny that the most suitable horse for this district is the one that can be used to the largest extent with the various implements, &c., used on the farm, and with buggy or in saddle if necessary. Such an animal would be very profitable, and would lead to the keeping of fewer horses. It is a common practice for farmers to keep several buggy or saddle horses, which could be well done without if a lighter and faster class of farm horses was bred. For hacks and trap horses solely a roadster mare (first cross) put to a blood horse will give the desired animal. For farm horses generally for this district he would advise breeding from good draught mares, put to roadster stallions. The progeny will be active, with plenty of life and pluck. They would be faster than our present animals, would be hardier, and generally better suited for our stump land. We have some fine draught animals here, but they do not stand travelling, consequently fall off in condition, and get rough coats. In this condition a few days' harrowing about knocks them up. A medium draught horse, or a big horse with better action, less hair about the legs, a finer coat, and lighter bone would suit us better. In this district it is a mistake to take the Clydesdale as a type of a good draught horse, as many judges at country shows do. We require something lighter.

Mr. Sims agreed that the medium horse was better suited for this district, but Mr. Turnbull thought there was a danger of such an animal being too spirited for their stumpy land; he would prefer a good draught horse. Mr. Robinson did not favor the cross recommended in the paper; their horses were getting too small as it was. They should keep two distinct classes of horses, the one for farm work and the other for saddle and harness. The all-round horse was generally much abused. Mr. Foulds thought they made a mistake in not having their mares foal earlier. To prevent "slipping" the mares should be almost reserved for breeding.

FIELD TRIAL.—It was decided to hold a field trial of stump-jump ploughs about the middle of September.

### Narridy, July 10.

Present: Messrs. A. McDonald (Chairman), W. J. Porter, R. Satchell, H. Nicholls, A. Bairstow, P. Beckmann, J. Darley (Hon. Sec.), and one visitor.

DAIRYING.—Mr. Satchell did not think there had been any improvement of late in the class of their dairy cattle. They had obtained a well-bred bull, but owing to so many mongrel bulls running at large it was doubtful whether any benefit was derived from him. Mr. Bairstow said they required cattle that would stand hardship. If they had gone to the expense of purchasing pure-bred stock of late the recent severe season would have destroyed them. The pure-bred animals did not appear to be so hardy as the crosses. He favored the Ayrshire or Shorthorn crossed with good hardy cows. He did not consider the Alderney at all suitable for this district. The best way to improve their cows was to raise the progeny of the best milkers; if a cow gave 7lbs. of butter per week she was profitable. He thought the main question that should engage their attention just now was how to raise fodder for their cattle to carry them

over the season when the natural fodders were scarce. Feeding the paddocks down occasionally with sheep would make the feed sweeter and improve the carrying capabilities of the land. Members generally agreed that feeding when young was a very important factor in the production of good cattle. Owing to the very dry weather during previous summer, fodder plants were generally a failure, and stock had recourse to different trees and shrubs, sandalwood, she-oak, and mallee being particularly mentioned. Mr. Nicholls said his sheep were very fond of a mallee with a blueish leaf. Mr. Satchell mentioned that his sheep refused to eat some of the mallee bushes some months ago, but were now taking to it. There was a kind of "manna" on the leaves which induced the sheep to eat them.

**PLOUGHSHARES.**—Mr. W. J. Martin tabled sample of new share made and patented by himself. Members expressed themselves as well satisfied with the appearance of the shares and thought they would prove cheap and durable.

**OFFICERS.**—Messrs. A. Bairstow and A. McDonald were elected Chairman and Vice-chairman respectively, Mr. J. Darley being re-elected Hon. Sec.

### **Watervale, July 12.**

**Present**—Messrs. C. A. Sobels (Chairman), H. Beck, W. Smith, W. Field, J. Thomas, E. Treloar, T. Stewart, J. Riley, H. Badcock, and E. E. Sobels (Hon. Sec.).

**FRUIT BOARDS.**—The proposed amendment of the Vine, Fruit, and Vegetable Protection Act was discussed. The members did not favor several of the clauses of the proposed amendment, and were of opinion that if the present Act was enforced there would be no necessity for further legislation.

**PRUNING.**—Mr. G. Quinn, Inspector of Fruit, gave demonstrations in the pruning of fruit trees to a good attendance of orchardists. He also gave an instructive address in the evening on the same subject, both of which were much appreciated.

### **Yorketown, July 17.**

**Present**—Messrs. J. Koth (Chairman), C. Domaschenz, G. Bull, T. Corlett, and J. Davey (Hon. Sec.).

**CONGRESS.**—The Hon. Sec. said he would endeavor to prepare a paper for the Ninth Annual Congress of the Bureau on "Raising of Fat Lambs for the Adelaide Market."

**CONFERENCE.**—It was decided to join with Minlaton Branch in holding a conference of Southern Yorke's Peninsula Branches at an early date.

### **Appila Yarrowie, July 9.**

**Present**—Messrs. J. W. Bottrall (Chairman), J. Wilsdon, J. C. W. Keller, A. Fox, J. W. F. Hill, W. C. Francis, J. Daly, J. O'Connell, and C. G. F. Bauer (Hon. Sec.).

**ANNUAL REPORT.**—The Hon. Sec.'s annual report showed that during the year seven meetings were held, with an average attendance of nearly twelve members, being the best average since the establishment of the Branch. He regretted that more visitors did not attend their meetings, which were always open to the public. Six practical papers were read and discussed, and a visit was paid by Professor Perkins and Messrs. A. W. Sandford and A. Molineux

of the Central Bureau. The Professor gave pruning demonstrations in Mr. Grant's vineyard, and in the evening a public meeting was held, which was addressed by the Central Bureau members. Messrs. J. W. Bottrall and C. G. F. Bauer were re-elected Chairman and Hon. Sec. respectively, Mr. J. W. Wilsdon being elected Vice-chairman.

**FORESTRY.**—The Conservator of Forests agreed to deliver an address on this subject at an early date.

**AGRICULTURAL SCIENCE CLASSES.**—Members supported the proposal for the establishment by the Government of agricultural science classes in country districts.

**BEST DAIRY COWS.**—Mr. J. W. H. Hill read a lengthy paper, of which the following is the substance:—

He proposed to give his experience of over thirty years, allied to the opinions gathered from others, and to consider the subjects under the headings of hardiness, adaptability to certain feed and climate, regularity in breeding, duration of time in milk, quantity and quality of milk for butter or cheese.

With regard to Holsteins, Mr. C. Tolstein, at a Farmers' Institute meeting, Canada, said one of his herd gave 15,000lbs., or 1,500galls. of milk in one year. Ten cows averaged 11,600lbs., forty cows averaged 9,000lbs., and fifty-five cows averaged 8,000lbs. per year. These results were obtained by careful feeding and housing. There are two breeds of Holsteins. One class has a black head, with black and white body, and is excellent for beef qualities; the other has a white head and black and white body, and is esteemed for its cheese-producing capacity. There is another breed in the same country called "Angler," this is the ideal type of a butter cow, and is red all over. The first two have been kept pure for over a thousand years. In the "Live Stock Encyclopedia" it is stated that the native cattle of Holstein are the "Angle" breed, and for the amount of food consumed they give a greater supply of milk than any other breed. Mr. Allen, another large dairyman and breeder, mentions one of his Holsteins which, at 6 years old, dropped a calf on May 15, weighing 101lbs., and from May 26 till July 26 gave exactly 4,018lbs. 14ozs. of milk: in ten days she gave 747lbs. 12ozs., or an average of 74·47lbs. per day. She gave a good flow until May 21 following, when she dropped twin calves weighing together 155lbs.

Speaking of the Ayrshires, the same writer says his thirty-six years' trial has proved satisfactory. They are hardy, healthy, and good milkers, giving large quantities of milk, rich for butter or cheese.

Some trials during the height of the season at the Earl of Chosterfield's dairy showed that the average per day was—from Alderneys, 4galls. 3qts.; Devons, 4galls. 1pt.; and Ayrshires, 5galls. The butter from this milk gave—Alderneys, 25oz.; Devons, 23oz.; Ayrshires, 34ozs.

The Jersey is unrivalled if quality or richness of milk is considered, but is not suitable for cheese-making, and questions have been raised as to her superiority as a butter producer.

The experience of many dairymen in Denmark, Great Britain, and America is to the effect that the cow which gives the best results is the best cow, regardless of her breed. Mr. T. Nuttall, at a meeting of the Northumberland Farmers' Club, said that unless a cow gives over 500galls. of milk per year she is not worth her feed; a good cow ought to give 800galls. to 1,000 galls. He favored crosses between Ayrshires, Shorthorns, and Channel Island cattle. More depends upon the bull than upon the cow in breeding. He would never use a bull unless he knew his mother and grandmother.

At Berry, in New South Wales, Mr. Norton won first prize for dairy cow with a South Coast animal which had neither Ayrshire nor Jersey blood. She had no extra feed for the show test. Her average yield of milk for fourteen days was 59½lbs. [The writer then quoted diverse opinions given at various branch meetings concerning the different breeds of cows.—(GEN. SEC.) He held the opinion that the best cow is that which gives the best results; but results may often be due to the person who milks the animal, kind treatment, quick or slow milking, whether properly stripped or not, and so forth. The following statement would show the difference:—Five cows were milked on alternate days by John and Tom, as follows—

Cow No. 1,	by John,	141lbs.;	by Tom,	170lbs.;	increase	29lbs.
" 2	"	152 "	"	227 "	"	75 "
" 3	"	219 "	"	302 "	"	83 "
" 4	"	177 "	"	190 "	"	13 "
" 5	"	176 "	"	222 "	"	46 "

As the last third of the milk contains more butter fat than the first two-thirds, the importance of thorough milking will at once be apparent. In another experiment conducted for twenty-two days with nine cows, a very rapid milker increased the amount of butter fat 17.73 per cent.

Mr. O'Connell thought a good milker should be able to properly milk a cow in five minutes. Mr. Wilsdon agreed, and said a fast milker would get more milk than a slow one. Mr. Hill said a person who could not milk a cow in five minutes ought not to milk at all. There was considerable difference of opinion as to which would be the best breed of pure-bred bull to introduce for improving the dairy stock of the district. The Chairman said he had an Alderney bull, and found the offspring the best milkers he had ever had.

### Port Germein, July 17.

Present—Messrs. G. Stone (Chairman), H. Gluyas, W. Head, E. McHugh, W. Crittenden, W. Broadbear, A. Thompson, T. S. Marshall, W. Mortess, and R. H. Henderson (Hon. Sec.).

FLAX.—Mr. McHugh reported that he had sown four acres with flax as an experiment. The crop was up, and looking well and healthy.

WHEAT PEST.—Mr. Head reported that a large acreage of wheat sown by him in March had been destroyed by worms. On examination he found at least twenty wire worms to the square yard of land. Mr. Crittenden did not think these worms were to blame for the whole loss, as he believed a good deal of the grain had malted in the ground. Members thought pickling with bluestone would prevent the worms from attacking the grain.

OFFICERS.—Mr. G. Stone was re-elected Chairman, Mr. H. Gluyas being elected Hon. Sec. in place of Mr. Henderson, who was unable to accept the position.

### Norton's Summit, July 22.

#### *Inaugural Meeting.*

Present—Messrs. C. W. Giles, J. J. Bishop, J. Bishop, sen., Thomas Playford, jun., John Jennings, J. Pellew, J. Jennings, jun., and W. H. Osborne.

BUSINESS.—Messrs. John Jennings and W. H. Osborne were elected Chairman and Hon. Sec. respectively. It was decided to meet monthly on the evening of the Saturday before full moon. It was decided to make an annual subscription of 2s. 6d. per member, with right to make a levy at any time to meet necessary expenses.

### Riverton, July 10.

Present—Messrs. John Kelly (in chair), Dr. Allwork, J. H. Kelly, T. Gravestocks, A. B. Welch, and H. A. Hussey (Hon. Sec.).

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the past year twelve meetings were held, with an average attendance of 7.5 members. Six valuable papers were read and discussed. Peach aphid has been very bad in some gardens, but other serious pests and diseases have been absent. Apples affected by codlin moth caterpillars were discovered in the local fruit shop, but owing to the action of the Hon. Inspector they were seized and destroyed. Messrs. H. A. Davis and H. A. Hussey were re-elected Chairman and Hon. Sec. respectively for ensuing year.

### HAY VERSUS SILAGE.

One hundred pounds of lawn mowings will maintain a cow in full health and strength for twenty-four hours, and she will give her best supply of rich milk upon that allowance. The same quantity of grass will make only 25lbs. of hay, and will not suffice to keep the animal alive. One hundred pounds of lawn mowings put in the silage pit will give 90lbs. of silage, which will keep the same cow fairly fat, and she will give a full supply of rich milk every day as long as the supply continues. The butter made from the milk of the cow fed upon silage or upon green grass will be rich in color and flavor, but that made from the milk of the cow fed upon dry hay will lack both flavor and color; it will, however, be hard, owing to the absence of a large portion of the oil which is always present in "spring butter." Green feed made into sour silage will go more than three times further in feeding cows than when converted into hay, and the animals will give much more and richer milk, whilst at the same time enjoying better health than when fed upon dry stuff.

## REPORTS OF INSPECTORS OF FACTORIES.

Office of Inspector of Factories, Adelaide, May 31st, 1897.

Sir—I have the honor to forward for the information of the Honorable the Minister of Industry the following report on the working of the Factories Act for the year ended December 31st, 1896:—

### APPLICATION OF ACT.

The Factories Act, which came into operation on the 1st February, 1895, applies only to such factories as are situated within the boundaries of corporate towns and such other districts as may be proclaimed manufacturing districts, on petition from the ratepayers thereof, under the provisions of the Manufacturing Districts Act, 1881. Up to the present, however, the scope of the Factories Act has not been extended beyond the boundaries of corporate towns.

### APPOINTMENT OF INSPECTORS.

Mr. Thomas Farrell—who was the first inspector appointed, and, assisted by the late Mrs. Zadow, initiated the working of the Act—was, on August 1st, 1896, transferred to the position of Keeper of the Adelaide Gaol, and on September 1st of the same year I was appointed to the vacant post.

The late Mrs. Augusta Zadow, who was gazetted an inspector on February 27th, 1895, and took a deep interest in the administration of the Act, died on June 7th, 1896, and on July 22nd following Mrs. Agnes A. Milne was appointed to replace her as Inspector of Factories.

Owing to these changes the work of inspection and registration of factories was temporarily interrupted, but Mrs. Milne, who had a long practical experience among factory workers and as workwoman herself, immediately after her appointment took up the work of inspection vigorously, and with marked success. From the date of her appointment to the end of the year she made 342 visits of inspection to factories, and earlier in the year 314 inspections were made by the late Mrs. Inspector Zadow.

During the four months that elapsed between the date of my appointment and the end of the year I was only able to pay a few hurried visits to some twenty or thirty factories, my duties as Chief Inspector to the Central Board of Health requiring most of my time. I may add that my appointment under the Factories Act is without extra remuneration.

The factory owners have, with a few exceptions, evinced a desire to comply with the provisions of the Act, and the inspectors have been able to get considerable improvements effected in many directions without recourse to law.

#### REGISTRATION OF FACTORIES.

Two hundred and sixty-seven factories were registered under the Act to the end of December, 1896, employing a total of 6,130 males and 2,314 females, including 683 young persons of both sexes, no children under 13 years of age being employed. Appended will be found a classified list of factories registered to the end of last year and the number of persons employed in them at time of registration.

#### PROVISION AGAINST FIRE.

The means of escape in case of fire are fairly good, and in a few of the larger factories a fire hose is kept ready for use, and buckets of water are in convenient places to provide for emergencies.

#### CONDITION OF WORKROOMS, ETC.

The majority of the workrooms are comfortable and well ventilated, but a few have come under the notice of the inspectors where the conditions are very unsatisfactory. These are mostly old buildings, sheds, cellars, &c., where women have to work under various disadvantages.

#### HOURS OF EMPLOYMENT AND OVERTIME.

The Act provides that not more than forty-eight hours per week shall be worked in factories by females or males under 16 years of age, except by giving notice to an inspector, when they may be employed for not exceeding twelve hours per week extra, provided the overtime does not exceed in all 100 hours for the year. The inspectors have had some slight difficulty from time to time to get employers to fully comply with the provision requiring notice to be given when overtime is worked, but on the whole I have no reason to think that there is any serious infringement of the Act in this respect. A few firms, however, appear to systematically employ their hands overtime throughout the year without any apparent reasonable necessity.

Appended will be found a return of overtime, made up from the records in this office to the end of the year 1896.

#### INTERVAL FOR MEALS.

In different factories the time allowed for meals varies. Some allow an hour, others three-quarters, and some half an hour. In all cases, however, where the meal time is shortened the employes get the benefit by getting away so much earlier in the evening, and this arrangement seems to give general satisfaction.

#### SANITARY ACCOMMODATION.

The provision requiring separate privy accommodation for the sexes appears to be complied with, but there is a lack of privacy in many instances that is very undesirable. Lavatory provision is of the scantiest description, particularly in the smaller factories, and a few were found to be without a water service of any description.

#### GENERAL REMARKS.

My rather short experience of the working of the Act will not warrant me in saying much respecting the effect it may have had on industrial pursuits, but, as the result of inquiries and from my own observation, I learn that a marked improvement has taken place in many directions since the factories

have been under the supervision of inspectors. I may also say that as the employers become better acquainted with the principles of the Act they view it with a greater degree of favor, and the majority now admit the utility of the measure.

I have, &c.,

JNO. BANNIGAN, Inspector of Factories.

The Hon. the Minister of Industry.

RETURN OF FACTORIES REGISTERED UP TO DECEMBER 31, 1896.

Description of Factory	Number Registered.	Number of Persons Employed.		
		M.	F.	T. P.
Aerated water and cordials.....	3	42	—	7
Boots and shoes .....	16	901	282	89
Bread, biscuit, and confectionery .....	7	166	28	26
Brush, broom, and mat .....	5	45	18	8
Box, bag, and trunk .....	3	20	56	6
Butter and cheese .....	2	22	—	2
Bicycle .....	5	94	—	10
Breweries .....	7	121	—	9
Bricks, pottery, and earthenware .....	2	30	—	3
Carriage, wagon, &c. ....	6	132	—	2
Carpenters, joiners, sawmills, &c. ....	2	79	—	—
Cooperage .....	1	14	—	—
Druggists .....	3	48	13	—
Dye works and laundries .....	3	8	23	—
Dressmaking, millinery, &c. ....	31	16	453	64
Distilleries .....	1	8	—	—
Furniture and upholstering.....	5	69	10	4
Flour mills .....	6	156	—	2
Gas works .....	1	30	—	—
Glass bottles.....	2	28	—	11
Hats and caps .....	2	25	19	4
Ironfounders, mechanical engineering, &c. ....	25	1,287	—	77
Jewellery, &c. ....	1	12	—	1
Marble and stone works .....	1	7	—	2
Preserving works—				
Meat .....	1	150	—	10
Fruit and pickles .....	3	29	35	6
Printing, bookbinding, &c. ....	26	807	133	78
Rope works .....	1	26	—	11
Shirts .....	6	5	78	4
Soap, candles, &c. ....	4	149	—	10
Saddlery and harness .....	2	121	4	8
Sugar refinery .....	1	63	—	2
Smelting works .....	2	575	—	—
Tea and coffee blending, packing, &c. ....	3	70	—	31
Tanning and woolscouring .....	7	192	—	29
Turnery in wood .....	1	6	—	—
Tailoring .....	60	270	1,104	117
Tin and wire working.....	2	174	—	33
Tobacco .....	6	168	33	10
Woollen mills .....	1	7	9	3
Waterproof clothing and rugs .....	1	3	16	4
Total .....	267	6,130	2,314	683

JNO. BANNIGAN, Inspector of Factories.



RETURN OF OVERTIME WORKED BY WOMEN OR YOUNG PERSONS IN FACTORIES FOR YEAR  
ENDING DECEMBER 31, 1896.

Description of Factory.	Number of Factories.	Women.		Girls under 16.		Boys under 16.	
		Number.	Hours.	Number.	Hours.	Number.	Hours.
Boots and shoes .....	2	120	1,418	—	—	—	—
Biscuits .....	1	17	275	2	77	3	137
Dress and mantle making..	6	137	1,820	—	—	—	—
Dye works .....	1	6	58	—	—	2	24
Knitting and underclothing..	1	16	268	2	24	—	—
Printing and bookbinding..	4	89	1,815	12	86	37	722
Paper bag and box .....	1	19	544	3	84	—	—
Shirts .....	2	35	1,096	1	10	—	—
Tailoring .....	6	164	2,166	14	196	—	—
Total .....	24	603	9,460	34	477	42	883

JNO. BANNIGAN, Inspector of Factories.

Office of Inspector of Factories, Adelaide, May 31st, 1897.

Sir—I have the honor to respectfully forward for your consideration the attached suggestions by which the Factories Act, 1894, might, in my opinion, be amended should further legislation in this direction be contemplated.

I have, &c.,

JNO. BANNIGAN, Inspector of Factories.

The Hon. the Minister of Industry.

SUGGESTED AMENDMENTS TO THE FACTORIES ACT, 1894.

1. The time within which a factory may be registered should be reduced considerably.
2. The number of workers necessary to bring a factory under the Act might also, with advantage, be lessened.
3. Should the number of workers fall temporarily below that named in the Act the workroom should still be under supervision for a term.
4. Inspectors should be empowered to require any occupier or owner of a workroom to supply particulars, although employing less than the number mentioned in the Act.
5. Shops might be included.
6. Record of each employé's time should be kept; also rate of wages, overtime, and particulars of work done for factories and shops by persons in their own homes.
7. The employés should receive a higher rate of pay for overtime, and should not be required to make up time lost by public holidays.
8. An annual return should be sent to the office of inspectors.
9. Notices of accident and any important changes in working of factory should be supplied.

10. Air and floor space should be defined and inspectors given power to order cleaning, limewashing, &c., where necessary: also proper arrangement of sanitary and lavatory accommodation and to condemn unsuitable premises.

11. Factory should not be used as a sleeping-room.

12. Inspector should have power to disallow, or recommend for disallowance, all unnecessary overtime.

13. Women or young persons should not be required to serve in a shop or other place of business after, or in addition to, working forty-eight hours in a factory for the week except as overtime.

' Office of the Inspector of Factories, Adelaide, January 17th, 1897.

Sir—I have the honor to submit the following report on the working of the Factories Act for the year ended December 31st, 1896.

Since my appointment as an Inspector of Factories, on July 22nd, 1896, I have made 342 visits of inspection and re-inspection to factories and workrooms. My inspections have been for the most part confined to factories and workrooms in which females are employed in the city and suburbs and Port Adelaide. In the performance of my duties I have been most courteously received by factory proprietors, and, with one or two exceptions, have been afforded every facility for making the necessary inspection.

#### IMPROVEMENTS.

Since the coming into operation of the Factories Act I have noted a marked improvement in a large majority of the workrooms, both as regards comfort, cleanliness, light, and ventilation; also in sanitary accommodation and general conditions under which women and girls have to work, and this good result appears to me to have been brought about without incurring any additional expense to the employer.

#### OVERTIME.

On the whole I find that the provisions of the Act are fairly adhered to. A few slight irregularities have occurred, such as failing to post up working hours, &c., neglecting to send notice of overtime, &c.; in these cases, however, the persons responsible have complied with the requirements of the Act when its provisions have been explained to them.

The overtime allowed under the Act, viz., 100 hours per year, has only been avoided to the full extent by one firm.

There does not appear to be any general rule for the payment of overtime work. Some employers make up the hours into so many days at the end of each season and pay the employés at the current rates, while others do not allow any extra pay for overtime. Recently I find that a few of the employers pay their hands at the rate of time and a quarter for overtime and an allowance for tea money. This is an example that I would like to see followed by all those whose business makes it necessary to detain their employés after 6 o'clock p.m., as many of the girls live some distance out of town, and their scanty earnings will not permit of payment for tea at a restaurant.

Referring to the question of overtime, required to be sent to an inspector under clause 13 of the Act, many of the employers complain that they are often unable to send it in twenty-four hours before commencing the work, and, as there is no reason to doubt this statement, the inspectors have accepted the notice when sent in as soon as possible.

## OVERCROWDING.

One or two cases of overcrowding have come under my notice, but when I have pointed this out it has always been remedied. Separate workrooms for the sexes are much to be desired, but it is difficult of accomplishment owing to the nature of the work in many cases throwing the workers so much together that employers do not see the necessity for separate rooms; others are contemplating alterations.

## FIRE ESCAPES.

Fire escape doors and staircases are very good in most places visited, but I would like to see movable fire escape contrivances attached to the larger factories, especially the boot factories. One or two of them have fire plugs and hose on the premises, also fire buckets always in readiness.

## ACCIDENTS.

No case of death from accident or death from any special cause connected with the factories has come under my notice. There have been one or two rather severe accidents, but in no case has there been any necessity to apply for a medical certificate under clause 15.

## OUTDOOR AND UNDERPAID WORKERS.

There are a great many persons who do work in their own homes for the shops and warehouses; but, not employing the number to make it necessary to register, I have simply inspected rooms and sanitary accommodation. I am of opinion that a great deal of "sweating" is carried on in some of these places, and in going my rounds I hear many sad complaints of the difficulty to make a bare living. Foreigners are chiefly blamed for the sad state of things, but I am of opinion that it is in a great measure the fault of the workers themselves, who clamor for cheap bargains, not caring how little their fellow workers get for their labor.

Cases have come under my notice where the workers have been offered 2s. per dozen for making men's shirts, 1s. per dozen for aprons, 1s. 6d. per dozen for children's pinafores, "tucked and frilled," and find their own cotton.

One instance has come under my notice where a woman who charged a shopkeeper 6s. 6d. for making a young lady's dress, and took the amount out in goods, was told she would get no more work, as the price was too high.

I have, &c.,

AGNES A. MILNE, Inspector of Factories.

The Honorable the Minister of Industry.



# Journal of Agriculture

AND

## Industry.

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No. 2. REGISTERED AS SEPTEMBER, 1897. [A NEWSPAPER. VOL. I.

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### NOTES AND COMMENTS.

Notwithstanding the frequent showers, the total amount of rain that has fallen has been disappointing, since the soil in most parts of the wheat-growing areas is quite dry at 6 in. below the surface. The long drought has drawn out the moisture from a considerable depth, and crops and herbage are likely to suffer unless the showers continue at short intervals during the next two months. So far, crops look promising, and, as the drought certainly has broken up, farmers and others are encouraged by the prospects.

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Some ill-considered remarks have been lately made by opponents to spraying Paris green for destruction of codlin moth larvæ, which may possibly excite an unreasonable prejudice against the use of cherries and other fruits. A large grower stated that he had made himself unwell through eating cherries, and attributed it to the proximity of the cherry trees to apple trees which had been sprayed for codlin moth destruction. Many people have suffered from eating freely of cherries where no Paris green or other material has ever been used. But even had the trees been sprayed heavily with the strongest mixture that can be used with safety to vegetation, it would be impossible that any injury could result from eating the fruit. Paris green consists roughly of one-half arsenic, one-quarter of copper, and the other quarter of acetic acid and other innocent ingredients. One ounce of this compound makes ten gallons of spray mixture; two gallons of the mixture will spray a large tree, leaves, branches, stem, and fruit, and a very large proportion of the mixture goes to waste and falls to the ground, so that only an infinitesimal quantity of arsenic and copper could possibly attach to the fruit, and even that quantity is soon reduced by action of wind, rain, &c. Analyses of fruit gathered seventeen days after spraying with Paris green have been made officially in this colony, with the result that hardly the faintest trace of the minerals could be found; and numerous analyses made also officially in the United States of America have shown that a ton of fruit would be required to furnish enough arsenic to affect the health of any person. Arsenic is used in comparatively large doses by some people as a tonic, and for other purposes; but should never be taken except under medical advice. Practically, if anyone wishes to injure his health by taking arsenic he would require to eat a ton of cherries at one meal in order to effect his purpose.

Mr. J. Grundy, Second Valley, recently sold some Lincoln wethers, through an Adelaide firm of salesmen, and realised up to 45s. each for some of them.

In considering the codlin moth question, it is important to remember that every full-grown codlin moth caterpillar found in bandages, crevices of trees, posts, fruit cases, stones, walls, or other places has been produced at the cost of at least one apple, pear, or other fruit upon which they feed; that they do not eat anything other than fruit; that each female caterpillar which escapes destruction will most probably mature into a codlin moth; and that each female moth will produce fifty to sixty eggs which will develop into caterpillars—and so on without end. The caterpillars which survive the rigors of winter and various enemies are comparatively few, and their first progeny will, if left unmolested, cause an increase of possibly only forty to sixty for each insect that survives the winter; but the later broods from the progeny of the first will be enormously increased in number. By scraping off old bark, killing as many caterpillars as possible in winter, much may be done to decrease the damage; by spraying all pip fruits four or five times at intervals of twelve days after the petals have fallen from the flowers, a deal more may be done in this direction. But these precautions ought to be supported by picking off the trees all fruit noticed to be affected and destroying the same, together with all fruit day by day falling from the trees. Finally, the stems of the trees should all be bandaged, and all bandages examined at least once in every ten days, and all caterpillars or chrysalids destroyed.

Fifty years ago all cereal crops were harvested by aid of sickle, reaphook, and scythe with cradle. Thrashing was principally done with the flail; ploughs were single-furrowed, heavy implements made of wood, and a great many labor-saving appliances of the present day were then quite unknown. At the present time a farmer must spend a small fortune in procuring the implements and machinery necessary to carry on his work. In the old days every farmer spent a lot of time and some money in providing shelter for his rude implements of husbandry and his live stock. In the present time there are a good many farmers who do not appear to consider it necessary to provide shelter for their most expensive machinery and implements, and the live stock may find their own protection against the vicissitudes of weather and climate.

If producers wish to secure a reliable market and paying prices, it is imperative that they furnish articles of the highest quality and finish. It is a most deplorable fact that some producers are careless of the reputation of the colony in these respects, and try to send away produce that is anything but first class in quality, and got up in a slovenly manner. Our customers in Europe are always ready to pay well for dainty quality and high finish; but the inferior and rubbishy produce goes into the slums, where "bed-rock" prices prevail. It is costly to send fresh products in refrigerators, and we must secure high prices to recoup the expense of transit. Everything sent, therefore, to the European or other outside markets should be of the finest quality, and no trouble should be considered too great in order to place it there in its most attractive form. "A penn'orth of care gives a pound of profit."

In 1896 the Bureau obtained from Messrs. W. A. Burpee & Co., of Philadelphia, U.S.A., seed of Burpee's All-head early cabbage, which they claimed to be the largest of early cabbages, and an all-the-year-round variety. Seeds were distributed to most of our Branches, and we have recently received a request for more seed from a correspondent at Belton (about twenty miles north of Carrieton), who states that a neighbor received some seed from a member of the Bureau. "and all through last summer, in spite of the most severe drought ever experienced here, the cabbages formed splendid solid heads and never showed any signs of withering. He believes it to be the best summer cabbage ever introduced." The Bureau has no more seed of this variety in hand, and, as far as is known, it is not sold by nurserymen in this colony, so that any persons who have raised plants from the seeds imported by the Bureau will do well to obtain as much seed as possible from them.

Orange and lemon trees will thrive best when planted in August or early in September. If planted towards the end of autumn they may probably live through the winter. The roots should not be buried deeply, and the bark of the stem must not be covered. The soil should be well drained, light, and of good quality. A rich shaly soil is best of all. The stems and limbs must not be open to the sun, but must be shaded by the leaves. Once the trees are planted do not dig so as to injure any of the roots, but keep the surface constantly open, loose, and fine to a depth of about 2in. These fruits take a deal of potash, sulphur, lime, and phosphoric acid out of the soil, therefore it is necessary to return these matters in the form of fertilisers. Do not use any commercial fertilisers containing common table salt, such as kainit, but use by preference nitrate of potash or muriate of potash, bonedust, or superphosphate of lime, sulphate of ammonia, or stable manure, and calcined gypsum. Thin out lightly when pruning, and remove all dead wood at once.

The Agricultural Bureau frequently receives complaints that seeds sent out by the Bureau or purchased from seedsmen do not germinate, and the seedsmen are blamed, when, as a matter of fact, the cultivator or local conditions are generally to blame. Some months back a farmer in the North wrote that he had purchased certain seeds from an Adelaide nurseryman and none had come up. He wished to know whether it was likely the germinating power had been purposely destroyed. He now advises us that the seed (French honeysuckle) sown in October, 1896, has, since the July rain, started to grow, showing that the seed was good, and that the absence of suitable conditions alone prevented germination.

A desire has been created for the introduction into the Northern agricultural districts of the continuous baling presses which are so universally used in the United States of America. These can be used for baling hay, straw, and similar substances, and will run through enormous quantities within a short time. By their aid, the farmers, in localities where neither stone nor wood are available, construct barns, sheds, stables, and shelters, using bales of straw in their stead. In this colony such bales could be used in the construction also of the walls of overground siloes, and also as weights on top of silage.

The Central Bureau has secured a small quantity of seeds of some of our best perennial saltbushes, and members of the Bureau in the North and Lower North who are desirous of trying same can obtain small packets for experiment on application to the General Secretary.

A member of Meadows Branch writes that it is a common practice to kill cows which have failed to be delivered of their calves; but he has had experience with animals which have relieved themselves of the dead and shrivelled foetus some time after, and the cows recovered their usual health in a short time.

There are many plants which give large profits when cultivated in other countries where the climate is highly favorable, and where the laborers can be satisfied with a wage of 2d. to 4d per day. The plants will also exist in this colony, but they do not thrive, and laborers' wages would absorb ten times the value of the crop. Amongst the plants which will grow in the open air here are ramie, sugarcane, tea, castor oil, pineapple, banana, cotton, and many others. Sugarcane develops scarcely any sugar in this climate; bananas and pineapples give scarcely any fruit, and that hardly fit to eat; and not one of the plants named would pay to grow if laborers' wages were at 2s. 6d. per week.

## NINTH ANNUAL CONGRESS.

The Annual Congress of the Bureau will be held in the Deputation Room of the Public Works Department, Victoria-square east, on Wednesday, Thursday, and Friday, September 8, 9, 10, 1897.

### AGENDA.

WEDNESDAY, SEPTEMBER 8.

10.30 a.m.

Opening addresses by Hon. L. O'Loughlin, M.P., Commissioner of Crown Lands, and Mr. F. Krichauff, Chairman of Central Bureau.

2.15 p.m.

Paper on "Manuring of Vegetables," by Mount Compass Branch; followed by

Paper on "Fodders for Hills Districts," by Mr. W. Pearson, Meadows Branch.

7.30 p.m.

Discussions on "Agricultural Science Classes" and "Portable Baling Presses," to be initiated by Stockport and Mount Pleasant Branches; and

Paper on "How to Produce Our Own Fertilisers," by Mr. H. Napper, Johnsburg Branch.



## THURSDAY, SEPTEMBER 9.

10 a.m.

Discussion on "Export and Nomenclature of Apples"; followed by Paper on "Fruit for Food, Cider, and Vinegar," by Mr. F. Krichauff, Central Bureau.

7.30 p.m.

Address by Professor W. Lowrie on "Dairy Cows and Milk Yields."

## FRIDAY, SEPTEMBER 10.

10 a.m.

Paper on "Breeding of Lambs for Adelaide Market," by Mr. Jno. Davey, Yorketown Branch.

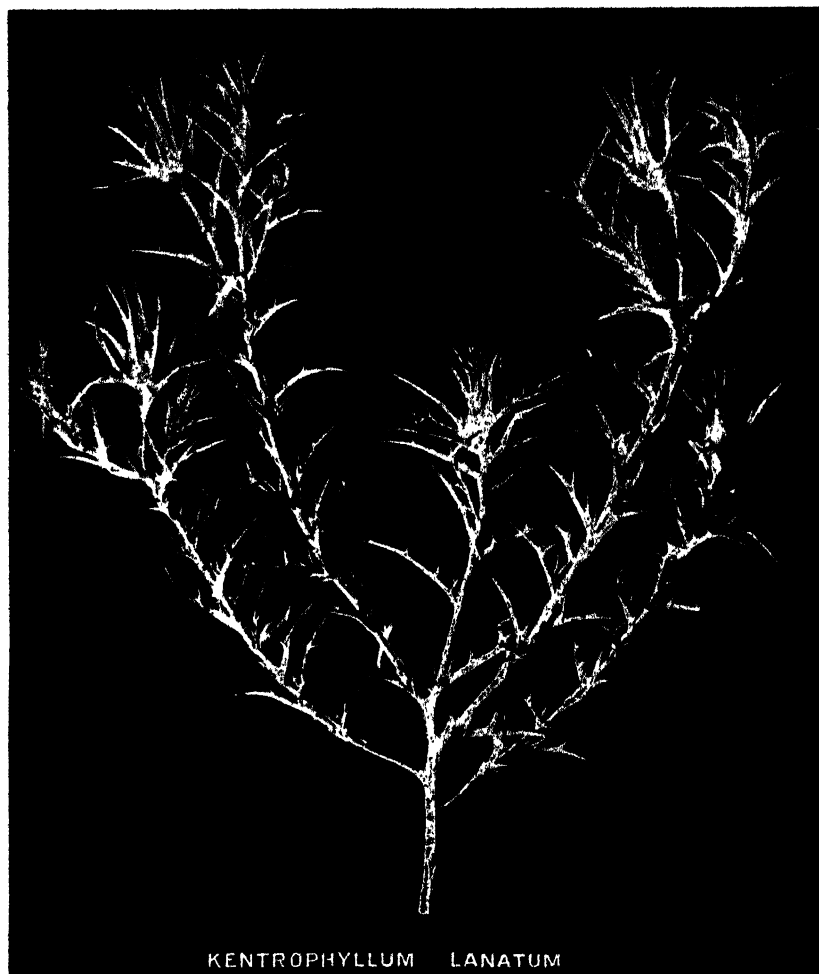
A large attendance of members of the Bureau is requested. All interested are invited to attend.

Will members of Branches attending the Congress kindly leave their names with the Secretary, so that they may be recorded in the report of the proceedings.

## NOXIOUS WEEDS.

**KENTROPHYLLUM LANATUM (SAFFRON THISTLE).** - This weed first appeared in the South-East, near Naracoorte, and was at first called erroneously "Star Thistle" (a name applying generally to the centaureas, but more particularly to *C. calcitrapa*). For a time it has also been wrongly named "Barnaby Thistle," a cognomen which properly belongs to the so-called "Yellow Star Thistle" (*Centaurea solstitialis*). The popular name of "Saffron Thistle" applied to *Kentrophyllum*, illustrated on page 98, is derived from its slight resemblance in form of flowers to the "False Saffron" (*Carthamus tinctorius*). *Kentrophyllum lanatum* has been declared a noxious weed "within the meaning of the Act," and is without doubt a most objectionable plant, being rejected by all kinds of live stock whilst there is anything else they can eat, and displacing plants of much greater nutritive value which would otherwise occupy the same land. In times of great scarcity of feed live stock will eat this thistle, and, when they have become accustomed to it, will even browse upon it when other vegetation is available.

Our illustration, reduced to about half natural size, is taken from a dry spike of flowers. When grown in good soil with enough moisture the plant will grow 3ft. or 4ft. high, and very vigorous, but under unfavorable circumstances the whole plant will be dwarfed. It sometimes lasts through the second year. The upper branches and leaves are slightly woolly. The leaves are bright green and somewhat irregular, the lower ones being larger than the upper, are "crinkled," and have sharp spines on the points along their edges. They are strongly veined, the bottom leaves having stalks, but these become shorter towards the upper part of the plant, until the bases of the leaves clasp the branches. The centre of the flower is intensely yellow, and the bracts surrounding each are bright green, with a number of sharp spines along the edges.



KENTROPHYLLUM LANATUM

**CIRSIUM ACAULE (STEMLESS HORSE THISTLE).**—This plant belongs to a genus of thistles comprising above eighty species, many of which are cultivated in gardens. This particular species has also been named *Cnicus acarna* and *Carlina acarna*. It is a pretty evergreen herbaceous perennial, prostrate, or growing close to the ground, the leaves spreading over the soil from a centre, in the heart of which the large purple thistle flowers are produced. This, and also many others of the genus, has been cultivated in gardens for the sake of its large "crumpled," whitish downy leaves, which are thickly armed on the edges with longish sharp spines. The flower heads are very large, some curved into the form of a horseshoe, armed with numerous spines, and with no stem whatever—proceeding directly from the crown. The dreadful Canada Thistle (or English Meadow Thistle) is very closely allied to this plant. It will grow on almost any soil, from dry limestone to the richest garden land. It was introduced to this colony quite as early as 1845, appearing first on the Adelaide



CIRSIUM ACAULE

park lands. For a very long time it made no progress, but latterly has spread by means of its winged seeds to all parts, so that it was deemed to be necessary to have it declared a noxious weed within the meaning of the Act, and this was accordingly done about four years ago. Stock of all kinds refuse to touch it unless driven to do so by starvation. The illustration shows a little over one-half of a very small plant, which was about 20in. across. Some of the largest of them will spread over a radius of 50in. or more.

## THE CANNA.

{By MAURICE HOLTZE, Director, Adelaide Botanic Gardens.}

Few flowers have been so vastly improved during the last few years as the Canna, known also as "Indian Shot." All the Cannas are natives of the warmer parts of America and Asia, and the first species, *Canna indica*, is supposed to have been brought to Europe as early as 1570. Gerarde in his "Herballe, or Generall Historie of Plantes," printed in London, 1597, says that in his time "it was in the garden at Padua, that he had planted it in his garden divers times, but it never came to flowering, and that it must be set or sown in a pot with fine soil, or in a bed made of horsedung, in such a manner as cucumbers and musk melons are." A few years later Parkinson says—"In some kindly years this beautiful plant has borne its brave flowers, but never any ripe seed, and that it will not abide the extremities of our winters, unless it meets with a stove or hothouse, such as are used in Germany: for neither house nor cellar will preserve it." About a hundred years after its introduction, Clusius saw it in flower in Spain and Portugal by house sides, and says that the inhabitants use the seeds for making their rosaries.

There are about thirty well defined botanical species of Cannas, and those have given us by hybridisation many hundreds of varieties. Of those species the following have been specially used to produce hybrids:—*Canna edulis*, *C. glauca*, *C. indica*, *C. liliflora*, *C. gigantea*, *C. iridiflora*, *C. flaccida*, and *C. warczewiczii*. The first gardeners who undertook the hybridisation of the Canna were Annee, Bihorel, and Lierval. Their productions, however, could not boast large flowers, and were more useful as foliage plants in the sub-tropical garden.

André Crozy, of Lyons, was the first to produce Cannas which could take a place amongst flowering plants, and our large flowering Cannas are, therefore, generally known as Crozy Cannas. Others followed in his steps. For instance, in France, Vilmorin; in Germany, Ernst, Lorenz, and Pfitzer; in England, Cannell and Paul; in the United States, Vaughan and Burbank; in Italy, lately Danmänn, with his *flaccida* hybrids.

Lombard, in France, produced, some years ago, from large flowering Crozy Cannas, by hybridisation with *C. iridiflora*, a set of hybrids which distinguish themselves through their pendulous flowers, and are known as *iridiflora* Cannas.

The cultivation of the Canna is of the simplest, and may be explained in the following few words:—"Plant in a good open soil, give plenty of sun, manure, and water, and cut the old flower stalks out." In our South Australian climate the roots may remain in the ground all the year, and will produce flowers for nearly nine months out of the twelve. It is, however, advisable to cut them down, take them out of the ground, divide them, and replant them in fresh ground in July or August. A rich light soil with plenty moisture suits them best, and they may be used to decorate the garden as beds, planted in separate colors, or mixed together in clumps between shrubs and other plants, as a cover to unsightly walls and fences, and as decoration in fountains and lakes, planted on small islands or sunk into the water planted in large pots or baskets.

The cultivation of *Cannas* from seeds can be only recommended if, on account of distance, roots cannot well be obtained; packed in moss the roots can, however, in winter be sent to long distances, and a six weeks' travel will not injure them the least. New varieties are also obtained from seeds, and in this case the seeds (which are very hard, and like little bullets, from which the plant has received the name "Indian Shot") are to be soaked for a few days in warm water, and then sown in a pot with leaf mould and kept in a warm place, when the young plants will generally make their appearance in a few weeks, when they can then be transplanted in good soil, where they will mostly flower the first year.

There are a great many varieties of this grand plant in the colonies, and our Botanic Garden possesses, without doubt, the largest collection. Many good kinds are obtainable at reasonable prices from our nurserymen, and I will here enumerate some of the best varieties. Some of them have only value as foliage plants, and are noted as such. All others are what is known as large-flowering (*Crozy Cannas*). The above-mentioned flaccida hybrids, called by the growers (Messrs. Dammann & Co., in Naples), "*Orchid-flowering Cannas*," and the *iridiflora* hybrids raised by Lombard will be found at the end of the list separately. All of them can also be used as foliage plants on account of their height and fine foliage.

#### A. -- LARGE FLOWERING.

1. Abel Carriere—Dwarf, leaves purplish-brown, flowers bright red.
2. Admiral Avellan—Good sort, with purple leaves and orange-red flowers.
3. Admiral Courbet—Leaves green, flowers citron-yellow spotted carmine.
4. Alphonse Bouvier—Leaves dark green, large flowers dark velvety-crimson.
5. Andromache—Leaves green with brown margin, flowers bright carmine shaded blood red.
6. Antigone—Leaves green, flowers scarlet, narrow yellow margin.
7. Atropurpurea—Foliage plant, with dark purple leaves, flowers small, rosy red.
8. Bacchus—Green leaves, flowers bright scarlet, with pale yellow margin.
9. Baronne de Sandrans—Leaves green, flowers brick red, with yellow margin.
10. Beauté Poitevine—Leaves bluish-green, flowers scarlet-orange.
11. B. Monnier—Leaves purple, flowers bright red.
12. Bellona—Tall, leaves large purple-bronze, flowers fiery purple-scarlet.
13. Bonne Etoile—A dwarf variety, with green leaves and red flowers.
14. Brenningsii, fol. variég—Foliage plant, with leaves striped and mottled dark and light green and yellow.
15. Capt. P. de Suzzoni—Leaves dark green, flowers yellow spotted brown-red.
16. Ceres—Leaves bluish green, flowers golden-yellow.
17. Charles Moore—Dwarf variety, with dark green leaves, flowers yellow, flashed with red.
18. Ch. Henderson—Leaves light green, flowers fiery red shaded purple.
19. Circe—Leaves dark green, flowers salmon, edged golden-yellow.
20. Comte de Ganays—Leaves bluish-green, flowers salmon, splashed red and edged yellow.
21. Comtesse de l'Etoile—Tall, leaves bluish-green, flowers chrome-yellow, plentifully dotted carmine.
22. Cousin Jacob—Leaves green, flowers bright red, edged yellow.
23. Discolor—A tall foliage plant, with large green and red shaded leaves.
24. Duchesse de Mortemart—A fine variety, with green leaves, flowers golden yellow, striped and spotted crimson.
25. E. Renan—Leaves purple, flowers bright carmine pink.
26. Edulis—Very tall foliage plant, with gigantic bright green leaves. Arrowroot is prepared from its roots.
27. Ed. Michel—Green leaves, flowers orange-shaded crimson.
28. Felix Crousse—Leaves green, tinged purple, flowers vermilion-red.
29. Fred. Wood—Leaves green, flowers apricot-colored.
30. Francisque Morel—Leaves green, flowers carmine-red.
31. Gartendirector Siebert—Leaves green, flowers fiery crimson.
32. Germania—Leaves green, flowers very large, vermilion with yellow margin, similar to Mad. Crozy, but color brighter and habit dwarfer.
33. Gloire d'Emple—Leaves brown, flowers scarlet-red.
34. Heligoland—Leaves green, edged purple, flowers fiery crimson striped and edged pale yellow.
35. Henry L. de Vilmorin—Leaves green, flowers yellow with brown-red centre,

36. Hugo Fuchs—Dwarf, leaves fresh green, flowers citron-yellow, lower petals painted blood red.
37. Ithaka—Dwarf, leaves fresh green, flowers scarlet, edged yellow.
38. J. D. Cabos—A showy variety, with purple leaves and apricot-colored large flowers.
39. Jean Liabaud—Leaves dark purple nerved, flowers red.
40. J. Cordieux—Leaves dark green edged purple, flowers brilliant red.
41. J. Soulayr—Good sort, with green leaves, flowers yellow, lower petals spotted red.
42. Kaiser Wilhelm—Leaves green, flowers vermilion-scarlet.
43. Koenigin Charlotte—One of the best, leaves bluish green, flowers large velvety blood red, with broad margin of canary yellow.
44. Laertes—Leaves fresh green, flowers light scarlet edged yellow.
45. Laforcade—Leaves metallic purple, flowers wine red.
46. Legionnaires—Tall variety, with purplish green leaves and fiery scarlet flowers.
47. Ljervalli—Tall foliage plant, with purple leaves and salmon-colored flowers.
48. Lieutenant Amelet—Leaves dark green, flowers dark carmine.
49. L. E. Bailly—Leaves green, flowers canary-yellow, spotted dark red.
50. Lohengrin—Dwarf, leaves green, flowers bright red.
51. Luna—Leaves green, flowers mahogany-brown, yellow edged.
52. Mad. Crozy—Leaves green, flowers large, bright vermilion with yellow margin.
53. Mad. Juste—Leaves dark green, flowers brick red, edged saffron-yellow.
54. Ma Petite Fille—Very dwarf, leaves green, flowers small, yellow, marked with lake-red.
55. Marquise A. de l'Aigle—Leaves green, flowers brick red, edged yellow. Imantophyllum-shaped flowers.
56. Martin Cahuzac—Leaves bright green, flowers clear vermilion.
57. Maurice Musy—Dwarf, leaves glaucous green, flowers lake, shaded pink.
58. Maurice Rivoir—Leaves purple, flowers purplish red.
59. Metallica—Tall foliage plant, with metallic purple leaves, flowers orange-red.
60. M. J. Goos—Tall, leaves dark purple, flowers large, velvety-purple, shaded blood red.
61. Miss Sarah Hill—Dwarf, leaves green, flowers dark carmine.
62. Moritz Jacob—Tall, leaves green, flowers chrome-yellow, spotted carmine.
63. Nardy Pécé—Leaves green, purplish tinged, flowers bright cochineal-red.
64. N. Belisso—Tall, leaves green, flowers salmon and pale pink.
65. Nigricans—Tall foliage plant, with dark purple foliage.
66. Niobe—Leaves bright green, flowers orange, edged yellow.
67. Ody. (na)—Leaves green, edged brown, flowers bright crimson, tinged violet.
68. Otto Froebel—Leaves pale green, flowers fiery vermilion, edged yellow.
69. Paul Bert—Leaves very large, dark purple, flowers dark orange-red.
70. Paul Lorenz—Leaves brownish green, flowers amaranth-red.
71. Paul Marquant—Leaves green, flowers deep salmon-tinted carmine.
72. Paul Siegrist—Leaves pale green, flowers velvety purple, edged yellow.
73. Pragmy—Leaves green, flowers pale saffron-yellow, spotted orange-red.
74. Perle des Massifs—Dwarf, leaves green, flowers large orange-red.
75. President Carnot—One of the best purple-leaved varieties, flowers vermilion-carmine.
76. President Chandon—Leaves dark green, flowers chrome-yellow, spotted brown.
77. President Favre—Tall foliage plant, with dark purple leaves, flowers crimson-shaded orange.
78. Princesse de Brancovan—Dwarf, leaves green, flowers scarlet, edged golden-yellow.
79. P. Bouquet—Leaves purplish-green, flowers large, apricot-colored.
80. Professor David—Leaves dark green, flowers red, mottled yellow.
81. Professor J. G. Baker—Leaves green, edged purple, flowers dark purple.
82. Progression—One of the best spotted varieties, leaves green, flowers golden-yellow, spotted brown.
83. Rose Unique—Leaves green, flowers carmine-pink, a striking color.
84. Safrano—Leaves green, flowers saffron-yellow.
85. Sénateur Millaud—Very tall foliage plant, with dark purple leaves, small orange flowers.
86. Sénateur Montefiore—Leaves green, flowers large yellow, spotted red.
87. Sirius—Leaves green, flowers yellow, striped red.
88. Sophie Buchner—Leaves fresh green, flowers bright scarlet vermilion.
89. Souvenir d'Aza Gray—Leaves green, flowers bright scarlet, brick-red.
90. Souvenir de François Gaulin—Leaves green, flowers clear yellow, spotted carmine.
91. Souvenir de Jeanne Charieton—Leaves light green, flowers orange-vermilion.
92. Stadtguertner Sennholz—Leaves green, edged purple, flowers dark scarlet.
93. The Garden—Leaves green, flowers dark saffron-shaded orange.
94. Tonkin—Dwarf, leaves green, flowers yellow, marked brown.
95. Trocadero—Tall, leaves green, flowers orange-scarlet.
96. Tros—Leaves dark green and purple, flowers large, carmine-purple.
97. Ulrich Brunner—Leaves green, flowers scarlet-cerise.

98. *Vesuvius*—Leaves bluish-green, edged brown, flowers cochineal.
99. *Victor Hugo*—Tall foliage plant, leaves dark green, flowers scarlet.
100. *Virginia*—Leaves fresh green, flowers canary-yellow, spotted scarlet.

#### B.—IRIDIFLORA CANNA.

1. *Alba rosea grandiflora*—Tall, leaves bluish-green, flowers whitish-pink and cream-colored.
2. *Albert Schenkel*—Leaves green, flowers rosy-carmine.
3. *Bruanti*—Leaves purple, flowers rose-shaded carmine
4. *Ch. Dippe*—Leaves purple, flowers carmine.
5. *Ehemanni*—Leaves green, flowers carmine-rose
6. *Guttermanni*—Leaves glaucous-green, flowers rosy-orange.
7. *Grand Atlas*—Leaves green, flowers purple.
8. *Mad. E. Benary*—Leaves green, flowers salmon.
9. *Mad. Margt. Bruant*—Leaves dark green, flowers carmine.
10. *Middle. Rose Lombard*—Leaves green, flowers rosy-salmon.
11. *Nouttoni*—Leaves green, flowers purplish-red.
12. *Souvenir l'Auguste Perrier*—Leaves green, flowers bright red.

#### C.—FLACCIDA CANNAS.

These Cannas have been raised by hybridising the large-flowering *Crozy* varieties with pollen from *Canna flaccida*. The flowers are exceedingly large and beautiful, but very ephemeral, and the flower spikes have seldom more than two or three flowers open at the same time. The flowers do not produce seeds, and the plants must be grown, therefore, from roots. The following varieties are at present obtainable from nurserymen:—

1. *Allemania*—Tall, leaves broad bluish-green, flowers scarlet with broad golden-yellow margin.
2. *America*—Leaves purple-shaded green and bronzy red, flowers fiery red shaded purple, throat orange.
3. *Austria*—Tall, very strong growing, leaves bright green, flowers canary-yellow, spotted slightly brownish-red.
4. *Bavaria*—Leaves bluish-green, flowers bright golden-yellow, splashed with scarlet-red.
5. *Borussia*—Leaves bright green, flowers canary-yellow spotted fiery red.
6. *Burgundia*—Leaves green, flowers golden-yellow, spotted scarlet, inner sepals scarlet-red.
7. *Italia*—Tall, leaves bright green, flowers bright scarlet, with broad golden-yellow margin.
8. *La France*—Leaves purple striped, metallic green, flowers bright orange-scarlet.
9. *Pandora*—Leaves dark purple and bronze, splashed green, flowers fiery red and purple, flamed golden-yellow.

We possess a great many more varieties, but the above will be sufficient for selection. Annually there are put into cultivation a number of new varieties, many of which are introduced into the colonies. I will, however, leave their description for another time.

I hope that this short article will induce readers who are not already growers of this beautiful class of plants to give them a trial. To prevent disappointment, however, I will remind my readers that ornamental plants are not distributed by the Botanic Gardens, unless as exchange for donations of valuable plants received previously.

**SHEA BUTTER.**—In answer to a question, "Shea butter" is obtained from the seeds of *Bassia Parkii*, a tree growing in Africa. The product is called "Galam butter" in that country. The Indian butter-tree is *Bassia butyracea*, a native of Nepaul and Almorah hills. The fatty substance obtained from the seeds is used to adulterate "ghee" (boiled cow-butter). The flowers of *Bassia latifolia* consist very largely of sugar, and great quantities are raked up from beneath the trees and dried as food. They are also used for the manufacture of spirit.

## "EMERGENCY" FODDERS.

Experience, extending over more than a century, has shown that the climate of Australia is very uncertain in regard to its rainfall, more especially on the southern portions. Periods of drought are painfully frequent; vegetation of nearly every description dies out; waterholes, creeks, and lakes dry up; and animals, both wild and domesticated, suffer famine and thirst more or less proportioned to the severity of the drought. At short intervals these droughts occur, and thousands upon thousands of sheep, cattle, and horses die from sheer starvation. The "good seasons" occurring between these periods of drought are often characterised by luxuriant growth of vegetation of all kinds, far in excess of the season's requirements for sustenance of the animals which have to live upon it. This surplus at the time is of no value; but if it could be made available for the periods of drought would be worth a great deal, and would save the lives of those animals which otherwise would die from starvation.

One is here forcibly reminded of the story of Pharaoh and Joseph in Egypt, and is tempted to offer the same advice which Joseph offered, and which saved not only the lives of the Egyptians, but also those of many of the surrounding nations. It will be remembered that Pharaoh acted upon the advice given, stored away great quantities of grain during the seven years of plenty, and thus not only saved the lives of his own people, but helped to save those of his neighbors—for a consideration.

This leads to the practice of ensilage, by means of which fodder may be preserved in pits for an indefinite period, secure against fire, retaining its succulence, and going much further in its sustenance of stock than when made into stack "silage," and still further than when made into hay.

Any nutritious plant can be made into ensilage; but it must always be borne in mind that the plants are not improved by being ensiled, neither are they deteriorated, except in so far that they lose a little of their weight and much of their bulk in the process. Green fodder stacked for sweet silage will lose a great deal of its moisture, and will not be so suitable at least for milking cows.

During the latest season great numbers of live stock on stations in New South Wales and elsewhere have been fed upon ensilaged natural herbage, upon lucern ensilage, lucern hay, &c., whilst upon adjacent runs the animals have died of starvation because similar provision had not been made.

"Geranium," native clover, and many uncultivated grasses and herbs could be stacked or turned into silos during the good seasons as provision against periods of scarcity. This, of course, involves a deal of labor, and some expense, and the value of the supply whilst there is plenty of natural fodder in the paddocks is of very little importance; but when there is not a blade of grass upon the farm or run, and there are flocks and herds dependent upon any provision made by their owner, the possession of ample supplies of forage in stacks of hay, lucern, or in siloes filled up with green cereals, sorghum, maize, or natural herbage places the owner in a position to carry his stock through in good condition, and possibly even to purchase from his poorer neighbors, and so take the fullest advantage of his provident forethought.

Such provision, however, is only such that every true farmer should naturally make in a country with such an irregular and uncertain a climate as that of Australia. Even the straw of his cereal crops is a valuable stand-by, and may be useful at all times in maintaining dry stock. The longer the straw is left upon the field after the grain has commenced to harden the less its value, and the less even will be the value of the grain. Exposure diminishes the quantities of oil, sugar, gum, starch, and aroma in the straw until at last there remains little else than vegetable fibre, equivalent in value to rotten tow.



Straw alone is liable to cause constipation, but this tendency can be corrected and the nutritive value of the fodder increased by the addition of about 1lb. weight of molasses to each 50lbs. of fodder. The molasses can be dissolved in 1gall. or 2galls. of water, and sprinkled over the straw. In some cases it may be desirable also to add a small handful of salt.

Amongst the plants worthy of the attention of Australasian farmers and graziers are the following :—

**THE PRICKLY PEAR** (*Opuntia* species).—The Prickly Pear, or Indian Fig, is largely used for fodder in North Africa. The variety grown there has much larger leaves and fruit than the one common in Australia, is a larger grower, and has less thorns. One variety indeed is practically thornless, being covered with a soft down instead of prickles. The fleshy leaves, which contain over 90 per cent. of water, are generally used ; but, according to an article appearing in *La Revue Tunisienne*, the fruits are far more valuable and nutritious. The Arabs live to a large extent upon the fruit from July till November. In Africa also the Kaffirs and Hottentots are very fond of the fruits. The Prickly Pear will grow in almost any soil, except of a moist and clay nature. Poor stony soils in dry districts suit it well. The yield of leaves or fruit is very large, and the spineless varieties require no preparation before being fed to stock. In South Africa this plant is largely grown, and the young leaves of the ordinary varieties are cut and passed rapidly through a fire to singe off the prickles, and then fed to ostriches and cattle. In the *New South Wales Agricultural Gazette* for April, 1897, Mr. W. L. Boyce, of Lochinvar, gives some particulars of his experience with these plants. In 1895, owing to the scarcity of other feed, he fed his cows on boiled Prickly Pear leaves, with very satisfactory results. For the first few days it acted as a purgative, but after that they kept the bowels nicely open, and the animals improved in condition. At first bran and salt were added, in order to get the cows to take to it ; but this is not absolutely necessary. Pigs also do well on the boiled pear. For a boiler he used a 200gall. iron tank, with a 17in. manhole, set in a trench in a sloping bank, with a fireplace 2ft wide by 18in. deep underneath, and a flue 2ft. wide by 6in. up the back. This gives a good draught, and the tank, being half buried, retains the heat well. About 9in. of water in the boiler is sufficient ; fill up with leaves and fruit of the pear in large bunches, put on the lid as tight as possible, make a quick fierce fire, and the steam will cook the pears thoroughly. They soon settle down in the boiler, when more should be added. The leaves can be easily removed from the boiler with an ordinary pitchfork, and if enough for two or more feeds is cooked at one boiling put the lid on at once, and the contents will remain warm for a day or two. After steam is up any leaves added will thoroughly cook in about twenty minutes. Where the plant is plentiful, and fuel and water handy, one man with two or more pots could look after 200 head of cattle. The boiling or steaming renders the thorns and prickles soft and harmless. The lid of the boiler must be close enough to confine the steam, else it will be necessary to cover the leaves with water, which means that much more fuel will be required. Mr. Boyce is so satisfied with his experiments that he intends planting the large-leaf spineless variety of *Opuntia*.

Mr. M. Holtze, Director of the Adelaide Botanic Gardens, has a few plants of this growing, and will give a few leaves for planting to anyone wishing to try it. It will be necessary for those desiring a few leaves to call or send to the Gardens for the same.

**THE AMERICAN ALOE** (*Agave Americana*).—In South Africa the Agave, or American Aloe, is considerably used in seasons of drought as a fodder for stock, principally ostriches and cattle. In Mexico, its native home, the Agave is regarded as a special stand-by. The following extracts from reports

furnished by gentlemen who have had experience with the plant are taken from the *Cape Agricultural Journal*:—

“During the late drought it has been found a most valuable resource, the starving stock not only having been kept alive, but they have done well, proving that the plant is both wholesome and nutritious.

“I tried the leaves of the American Aloe cut in strips, and passed through the chaffcutter. It was eaten by the ostriches with avidity, and with some mealies (maize) the birds did right well. With the addition of bran my Shorthorn bull seemed to like it, and did well on it. It is not so laxative as Prickly Pear, and I think more nourishing. Sheep are very fond of the small plants.

“I have had considerable experience in testing its excellent qualities as a fodder for sheep, cattle, and ostriches. Horses do not take to it. The fruit pole of the aloe gives a splendid yield. The ostriches remained in first-class condition. The oxen kept in good working order, and milking, which would otherwise have been suspended, was carried on through the drought. The leaf itself is excellent fodder, and I find that once sheep and cattle have become accustomed to it they will not leave it alone, even in good seasons, when they have plenty of green feed, such as lucern, barley, &c.

“There are now planted on this farm some twelve miles of American Aloe fencing, chiefly along the boundary, but I fear it will prove a failure, as cattle, sheep, and spring-bucks all take it greedily as soon as the pasturage gets a little dry.

“It will grow anywhere except in wet ground. It should have at least a square yard to each plant. I cut away the outside leaves for food, leaving the inner ones to unfold for the next year. If planted as I suggest its production per acre would be greatly in excess of any fodder plant I know of.”

As the American Aloe will grow well even in the driest portions of this colony it would be worth a little trouble and expense of planting some as fences. The only treatment of the leaf required is to cut in slices lengthwise and chop it up with a chaffcutter or other implement.

“**TREE LUCERN**” (*Cytisus proliferus*).—Another plant of considerable value is the so-called “Tree Lucern.” This plant was introduced by the late Dr. Schomburgk in error for the true *Tagasaste* (*C. palmensis*). In many parts of the colony it has done exceedingly well, and where stock has got accustomed to it they do well on it. Like many other fodders, however, it is sometimes difficult to get the animals to take to it. It will grow in a variety of soils, and once established grows rapidly and resists the severest drought. As a breakwind for an orchard or vineyard it is doubly useful, as the clippings can be fed to stock. For planting hedges, sow the seed in prepared beds, and when large enough to handle set out the plants at about 6ft. apart. For grazing, either sow in furrows about 4ft. apart, transplanting to fill up misses, and protect from stock until firmly established, or sow in nursery bed and transplant to about 4ft. to 6ft. each way. To cause fresh succulent forage the plants should be pruned down every year, especially at the top, where stock cannot reach to browse upon the foliage.

**FURZE** (*Ulex europæus*).—Furze, gorse, or whin has long been known to possess considerable nutritive value as fodder for farm stock in England and Scotland. Dr. Voelcker and Mr. Lawes (Rothamstead) gave the following analyses:—

Foods.	Flesh-forming.	Fat-forming.
Furze .....	3.21	9.38
Mangolds .....	1.51	8.60
Swedes .....	1.91	5.93
Carrots .....	0.60	10.18
Turnips .....	1.80	4.43

For several years past pastoralists in the poorer parts of New Zealand have been experimenting with furze in feeding their sheep, and the results have been highly satisfactory. At Raglen Mr. Moon has fed his sheep on furze to a considerable extent during twenty years by systematically burning off the old plant in rotation, and thus promoting young and succulent growth. In Waikato as many as three sheep per acre have been maintained on young gorse for several months in winter and part of the hot dry summer. Afterwards fifty-six of the same sheep were put on twenty-seven acres, when the young plant was 6in. to 8in. long. About half the land was covered with furze, and the rest with weeds and foggy grass. At end of June the sheep had improved to nearly fat, the furze being eaten down close whilst the grass was hardly touched. This is equal to four sheep per acre during autumn. The most successful experiments in this direction have been carried out by Messrs. Williams at the Bay of Islands, where much of the soil is of a poor gravelly nature—as poor as can be found. Land which formerly carried only 300 sheep was in two or three years so improved by the spread and cultivation of furze that 2,000 were depastured on the same area, and kept in far better condition than the small flock of former times. Furze seems to benefit the land. Furze should not be allowed to go to seed, and if not eaten close down should be mowed every year to keep it young and succulent. Messrs. Williams plough four furrows about 4in. deep, and sow the seed on these strips, leaving a space of 3ft. between, which enables the sheep to browse on both sides of the rows, eating the furze close down and not injuring their wool. Seeds of a spineless double-flowering variety of gorse or furze have been sown, but not long enough to give reliable results. The quality of the mutton and of the worth of sheep fed upon furze is uniformly satisfactory. Furze would not grow on our plains, but in the moist, hilly districts, on poor soil, will do well. On some of the more elevated portions of the Flinders Range it should also succeed.

**SHEAOAK** (*Casuarina quadrivalvis*).—Sheaoak tops have long since been recognised as a valuable fodder in seasons of scarcity, and lamentable destruction has been effected amongst these trees by teamsters. Sheep and cattle are very fond of the foliage and pick up the fallen leaves regularly. If live stock are kept out of any place where sheaoak trees have lately existed great numbers of young trees will spring up, and in about four years will become large enough to allow of stock being readmitted, and they will obtain a large amount of food from the leaves which fall all the year through. The male and female trees are slightly different in appearance, this being more apparent when they are in flower. Grass will grow beneath the branches of sheaoaks right up to the stem or trunk.

**BUCKBUSH** (*Salsola kali*).—This is a plant which seems to luxuriate in dry hot weather when even the indigenous saltbushes succumb. The plant is deep-rooted, keeps green and succulent where everything else is dried up, and is much liked by cattle when they have once taken to eat it. Milking cows maintain their condition, and give good quantities of rich milk when they can get “buckbush” to eat; but they require an education before they will touch it. The plant is thickly provided with short, stiff, sharp spines, but when eaten they do not appear to be harmful.

There are many indigenous shrubs and trees which afford nutritious food for live stock, including the numerous “saltbushes” (which should be cultivated, especially on all farms), *Eremophilas*, *Dodonæas*, *Myoporums*, Sugar Gums, Gunn’s *Eucalypt*, *Peppermint Gums*, *Acacias*, &c. Where these or other bushes or trees upon which stock browse are growing naturally, care should be taken that the plants are not destroyed by overstocking. Larger trees should have the branches lopped and not cut right down, as has been done in many cases.

## PLANTS FOR ALKALINE AND SALTY SOILS.

Owing to frequent inquiries concerning plants which will grow on alkaline and salty soils, the following information has been collated from publications in the Bureau library:—

### Fodder Plants.

**GRASSES.**—*Agrostis alba*, var *stolonifera*—A perennial pasture grass of considerable value; grows luxuriantly on moist soils, or on land subject to periodical inundation; will also thrive on saline wet soils. *Alopecurus bulbosus*—A perennial grass, growing on salt marshes. *Chloris glauca*—A tall, handsome grass, producing a large amount of comparatively tender herbage; grows on brackish marshes. *Elymus condensatus*—A tall, coarse perennial, native of British Columbia, where it grows on alkali-impregnated soil; by some authorities it is regarded as of some value for fodder if cut or fed down before the stems get hard, but others regard it as useless for this purpose. *Glyceria maritima*—A slender grass with creeping rhizomes, growing along the tide-water marshes of the seacoast in parts of North America, where it is regarded as of considerable value. *Panicum grus-galli*—This well-known and valuable annual fodder grass does best on light, rich, moist soils, and is also reported to succeed on somewhat saline soil, and particularly on brackish watercourses. *Paspalum distichum*—A slender creeping grass, biennial or perennial; thrives well on salt marshes: is injured by frost. *Poa distans*—A slender perennial, suited to moist saline soil. *P. Fosteri*—Tall perennial, very nutritious. *Psamma arenaria*—The well-known Marrem grass, the best of all sand-binders. The late Baron von Mueller says it can be grown on sandy saline soil inland; of very doubtful value as a fodder except when quite young. *Spartina juncea*—One of the most valuable grasses growing on the American salt marshes, large quantities being cut for hay: grows from 1ft. to 2ft. in height: perennial. *S. stricta*—Tall, coarse perennial salt-marsh grass, of little if any value for feed, but makes first-class thatch. *Sporobolus airoides*—Stout, coarse tussock grass, growing on sandy and more or less alkaline or saline soils along rivers and streams; eaten by stock when more tender grasses are not available. *S. asperifolius*—A low creeping perennial, growing on alkaline plains. *S. orientalis*—A wiry creeping perennial, growing upon saline soils; fairly good fodder. *S. Wrightii*—A stout, tall-growing perennial, producing a large quantity of coarse feed; as a hardy perennial for saline bottoms subject to flooding is worthy of attention. *Zoysia pungens*, or Coast Couch Grass—An indigenous perennial creeping grass, growing on sandy shores, an excellent fodder plant, and reputed to succeed well on saline soil.

### Fodder Shrubs, Trees, &c.

**MANGOLDS.**—In many parts of South Australia good crops of mangolds have been grown on alkaline soil. Its value as food for stock is too well known to need mention. It is stated that land too salty for cereal crops will, after two or three crops of mangolds have been taken off, give a good yield from a wheat crop.

**SALTBUSHES.**—Amongst the most valuable of all fodder plants for alkaline soils our indigenous saltbushes rank highest. These include species of *Atriplex*, *Chenopodium*, *Kochia*, and *Rhagodia*. Very careful experiments have been conducted by the University of California with these plants on their alkaline soils, and the reports are most satisfactory. Amongst the best of the native perennial saltbushes are the following:—*Atriplex semibaccatum*—A

procumbent plant of vigorous habit; will thrive on strong alkaline soil where very few other plants will grow; small plants set in alkali spots in Tulare County (California) made a thick matted growth, 16ft. in diameter, in one year. *A. nummularia*—One of the largest of our saltbushes, and also one of the best; grows very quickly, reaching a height of from 6ft. to 8ft., and produces a large amount of nutritious fodder. *A. halimoides*, *A. leptocarpa*, and *A. limbata* are smaller in growth, dwarf or prostrate, but produce a large amount of fodder annually. *Chenopodium auricomum* is an erect perennial, from 3ft. to 5ft. high; a rapid grower and very valuable. *Kochia villosa*, *K. aphylla*, *K. sedifolia*, *K. pyramidata*, and others are hardy, drought-resisting shrubs, from 1½ft to 4ft. in height; strong growers, and very valuable. *Rhagodia billardieri* is a hardy shrub, generally found on or near the sea coast; grows rapidly, attaining a height of 8ft or more. *R. parabolica*, or "Old Man Saltbush," is one of the best known and most highly valued of all the saltbushes; grows to a height of 10ft. *R. hastata* is a smaller grower, very hardy and valuable. *R. nutans* is a spreading, prostrate plant, covering a large space in suitable soil. Cultivation.—Most of these saltbushes are easily propagated by means of either cuttings or seeds. Generally speaking, the best results will be obtained by planting in the autumn before the land gets too wet and cold, but seed sown in early spring, while the soil is still moist, will frequently do as well. Best results will be obtained by sowing seeds in beds and transplanting when the young plants are about 3in. or 4in. high. Cuttings should be of medium-size wood, 8in. to 10in. long, and set in the ground at least 6in.

CAROB BEAN (*Ceratonia siliqua*).—Experiments conducted at the Tulare Station, California, show that this very valuable fodder plant is fairly well adapted for alkali soil, a five-year-old tree on rather bad sandy alkali soil being over 10ft. high.

TAMARIX AND CASUARINA, OR SILAOAKS.—The various species of these two diverse genera of plants thrive remarkably well on alkaline soil, and in seasons of scarcity their foliage is of considerable value for stock. They are hardy, quick growers, and easily propagated, the former from cuttings and the latter from seeds.

### Miscellaneous Trees.

According to the 1894-95 report of the University of California, the following trees have been found to succeed on more or less alkaline soils:—Sycamore (*Platanus orientalis*)—A rapid grower, hardy, and the largest alkali-resisting tree yet tested; a plant, five years from seed, on extremely bad soil, measured 26ft. in height and 24in. in girth 3ft. from the ground. Poplar—A number of species of poplar, including *Populus canadensis*, *P. Fremontii*, *P. fastigiata*, and others do well. Oaks (*Quercus Robur*, *Q. lobata*, *Q. cerris*, *Q. pedunculata*) will grow on mildly alkaline soil. Mulberries—The Russian and Japanese thrive on alkaline soil, but the American varieties will only succeed on medium grades of alkali. Some of the maples do well, but the Pacific Coast and Japanese large-leaved forms are so far a failure. The cork-bark elm and the slippery elm (*Ulmus fulva*) do well. Locust trees (*Robinia pseudacacia*) do well and make strong growth; also *R. viscosa*. The honey locust (*Gleditsias*) also grow well, but are not large. *Eucalyptus amygdalina* and *Grevillia robusta* do fairly well on medium alkaline soil. Palms—The African and Arabian dates will grow on such soils, some being very resistant to alkali. The best of the Phoenix family for this class of soil is the wild date (*P. canariensis*). Some of the pines do fairly well, especially *Pinus canariensis*. The Texas umbrella tree (*Melia Azedarach*) is widely planted, and seems to grow where few other species thrive. The native myrtle, or cockatoo bush (*Myoporum insulare*), does

well on moist saline soils, and makes good hedge plants, especially on sandy soil; it is readily propagated from cuttings, and is a valuable plant for arresting drift sands. Several varieties of fruit trees will grow on moderately alkaline soil; the hardiest is probably the pomegranate. The common quince and the pear are also resistant, and may be grown on the less alkaline soils. Of all fruit, however, the pomegranate and the mulberry are best for these soils.

## NOTES ON VEGETABLE-GROWING FOR SEPTEMBER.

BY GEORGE QUINN.

In mild situations, where late spring frosts are rare, tomato plants can be set out in the open ground when they have reached a height of from 4 in. to 6 in., according to the sturdiness of the plants. Some growers shelter the plants from the cold or rough winds by the use of kerosene tins cut in two lengthways in an oblique manner, retaining the top attached to one half and the bottom to the other. This affords a covering above and on two sides of the plants. As soon as the plants are well established and can bear exposure a stake of common bamboo reed, wattle, or any suitable timber should be provided, and the stems tied up to the same from time to time. This keeps the fruit out of the dirt and wet, giving a more even sample and greater freedom from diseases. Second sowings of tomatoes may be made in outdoor pits with slightly raised sides or sunken walls, so that a covering can be placed over when necessary.

Towards the end of the month, in early mild districts, cucumbers could be put out under glass shelters, but the attempt is risky.

Growing crops of peas should be staked, and the soil well stirred between the rows. Red and silver beets may be transplanted.

Sow lettuces and cress; radishes of the short type can be sown in cool situations, where shade may be given. In small gardens these sowings may be made every third week to keep up a succession of these salad plants. As the month progresses make sowings of melons of various kinds—water, sweet, and pie.

Cucumbers, marrows, gourds, pumpkins, and trombones; these should be sown in rows, and the vines afterwards trained to allow for irrigation channels being opened. They seem very partial to humus; consequently all available green weeds should be turned under the soil intended for their reception. It is a good plan to sow the seeds in small hillocks raised several inches above the surface of the surrounding soil, so that the stems will not be injured by water around the collar sections.

Sowings of dwarf and runner beans should now be made in the earlier localities referred to. Canadian Wonder, Dwarf White, Caseknife, Negro, and Pale Dunn are all good dwarf sorts; but an American variety called "Best of All" was tested by the writer, and yields quite three weeks earlier than Canadian Wonder when sown upon the same date side by side. Of the tall sorts, Asparagus, Butter, and Caseknife varieties are considered good.

All the ground between rows of vegetables should be hoed frequently. Potatoes should be hoed up as required.

In the mountainous districts, where plenty of water is available, continue the sowings and transplantings recommended in notes for last month.

**LETTUCE RUST.**—Early in August the Hon. Secretary Gawler River Branch forwarded plants of lettuce showing numerous brown spots on the leaves, which later on develop and cause holes similar to those caused by shothole fungus in apricots. The lettuces become attacked about the end of July, a few spots appearing here and there, and rapidly spreads until the leaves become completely riddled and spoilt. Early plants appear to escape the disease to a large extent, while some varieties seem less subject to it. Plants of Iceberg lettuce growing alongside a badly-diseased patch of plants only show a few holes here and there. Specimens of diseased leaves were sent to Professor D. McAlpine, vegetable pathologist of the Department of Agriculture, Melbourne, who kindly examined them, and reports that the lettuces are attacked by a fungus which does not seem to have been observed before, and which is a new species. He has named it *Fusarium lactucæ*. Since the disease is new he cannot speak definitely of remedial action; but as a different species of the same genus occurs on tomatoes, causing what is known as the "sleeping disease," similar measures to those adopted for that disease may be recommended in this case, that is, to carefully remove and burn infested leaves and make a liberal application of lime to the soil. Good drainage, to promote aeration of the soil, and a sufficiency of plant food in the soil should be provided.

## ARSENICAL SPRAYING FOR THE DESTRUCTION OF CODLIN MOTH,

WITH NOTES ON THE LIFE HISTORY OF THE MOTH  
IN SOUTH AUSTRALIA.

BY GEORGE QUINN.

In South Australia the codlin moth exists in the caterpillar form during the winter, hidden away snugly in its cocoon woven in the cracks and knotholes of fruit trees, posts, stakes, or anything in the orchard that is available at the time when the caterpillars leave the fruits. They also winter in fruit boxes, cracks in fruit rooms, cellars, &c. About September on the plains country—a few weeks later in the cool hilly districts—these caterpillars gradually change to their pupa or chrysalis forms. During the first week in October some of the moths, which have formed inside these reddish-brown cases, split open the thick ends of the pupæ shells, and emerge as fully-developed insects. The sexes pair, and a few days later the females begin to deposit fertile eggs upon the young fruits which are then formed. In about six days, according to the best European and American authorities—the egg-hatching has not been tested in this colony yet—the young caterpillars emerge, and are almost too small to see plainly with the naked eye; but, by close examination, I have found them crawling upon the surfaces of pears. These small caterpillars burrow into the pulp of the fruits, and in about three weeks are mature. They invariably eat the kernels out of some of the seeds, but not just prior to quitting the fruit, as described by European entomologists, for larvæ a few days old can be traced into the core, and be found inside the husks of the pips. When full grown the caterpillars quit the fruits, whether they still hang upon the tree or fall. If on the tree they lower themselves by means of threads to the ground or branches below, when they crawl about the trees, or stakes, posts, &c., looking for crevices in which to spin cocoons. If the fruits are taken into fruit rooms, they find cracks in walls, &c. If the fruits are left in boxes for a short time, the caterpillars secrete themselves in the cracks or corners of the

boards. Thus far the life history here tallies with that of colder countries. By definite experiments of hatching the larvæ in ventilated boxes hung in trees having all the characteristics of the natural conditions, I have been able to arrive at the opinion that we have at least two distinct broods of codlin moths here. The first brood emerges and acts in the manner described above, and before Christmas some of the first caterpillars which quitted the fruits have again passed through the changes of cocoon-making, changing into pupæ forms, and emerging as perfect moths, ready to start the cycle of egg-laying, &c., over again upon the then almost fully-grown fruits.

These experiments proved that the winter caterpillars hatch into moths irregularly from the beginning of October until the middle of November, and deposit their eggs accordingly, giving rise to a succession of young caterpillars until the beginning of December. About the third week in December the first moths of the second brood begin to appear and deposit eggs, and members of this second generation of moths continue hatching and egg-laying until the end of February. Thus, upon the dry plains country, we find minute larvæ burrowing the fruits until well on in March. This overlapping of broods would give the impression that there were greater numbers of generations than actually exist.

In this colony the apple and pear fruits are attacked equally badly, the quince coming next, usually from later caterpillars. I have on rare occasions found larvæ in peach, apricot, plum, and nectarine fruits, but have not yet succeeded in hatching a moth from any of these. Up to the present all attempts at dealing with the fully-developed insects, viz., the moths, have proved useless; but the habits of the caterpillars are decidedly in favor of their destruction before they enter the fruits or after they leave them.

If at the time the first minute caterpillars emerge from the eggs the fruits are thoroughly enveloped in a film of matter poisonous to them—the nearer the fruits are to being perfectly coated the more complete will be the destruction effected—the small insects will not penetrate the fruits. Then, as the fruits swell rapidly at first in growth, and freshly-deposited eggs develop into larvæ, so the poisonous coatings must be repeated at short intervals to counteract these effects; bearing in mind always that every caterpillar of the first generation destroyed will probably mean twenty less in the second generation, it is all-important to do the work thoroughly from the outset. Arsenical sprays have been proved satisfactory in many parts of the world, where tested with the thoroughness suggested above, as a means with which to coat the fruits for poisoning the young larvæ. Paris green, when properly compounded, has been the form usually found most in favor; but it must be properly compounded—every minute crystal should contain its element of poison, and as it is ground to an impalpable powder these poisonous grains can only be separated by microscopic aid. The spurious samples sold often contain more arsenic than the proper compound, but coarse crystals of uncombined arsenic are not likely to be taken up by a minute caterpillar whose mouth is hardly as wide as the end of a coarse hair: besides this defect, the disastrous results of this pure and partly soluble arsenic upon the foliage and bark of the tree would be enough to condemn its use. The certainty with which the caterpillars will exist without feeding, after escaping from the fruits, in stakes, rubbish, posts, walls of buildings, fruit rooms and cases, on stems of trees, &c., until ready to emerge as moths, shows us how necessary it is to remove all of these harbors by scraping the trees clean of rough bark, crevices, &c., and using bandages around stems and limbs to trap the larvæ, examining them weekly, keeping all rubbish, stakes, &c., away from the orchard, removing trees that grow over outbuildings, fences, &c., collecting from trees and ground as far as possible all infected fruit for immediate destruction, or destruction of the larvæ therein,



being careful about what we put into our own fruit cases, and what we receive in cases from others: and, what is also important, making fruit rooms as far as possible smooth-walled and closely-ceiled, so that, being empty of fruit in the springtime, when moths begin to hatch out, a thorough fumigation may be applied with sulphur or cyanide. It might well be added that cultural and training operations which are conducive to low-spreading easily-reached trees, sound and sturdy in limb, will be a most important factor in dealing with this pest; but, apart from preventing the ravages of codlin moth, the other advantages claimed by this last suggestion will no doubt be convincing to many enterprising orchardists.

In view of the controversy in South Australia as to the value of spraying with arsenical compounds for the eradication of the codlin moth pest, the following extracts from recent correspondence will be of interest. It must be remembered, in computing the cost of the operation, that nearly all progressive growers spray with Bordeaux mixture for the suppression of apple and pear scab, and therefore for the first two sprayings with Paris green there is no extra cost for labor, as the two can be used together.

In February last the Agricultural Bureau communicated with Professor L. O. Howard, head of the Entomological Branch of the United States Department of Agriculture, and one of the foremost authorities on Economic Entomology, asking him for his advice as to treatment for codlin moth (*Carpocapsa pomonella*), giving him at the same time the substance of the recommendations of the Bureau as to scraping, whitewashing, bandaging, spraying with Paris green, &c.

On the 26th May the following letter was received from Professor Howard:—“Your letter of the 26th of February duly received. You seem to have pretty well summarised the measures to be employed against the codlin moth. All of the methods mentioned have been practised or are being practised in this country. Nevertheless, our main reliance, or almost sole reliance, is on arsenical sprays. Paris green and London purple are the poisons commonly used, and at the rate of 1lb. to 150galls. or 200galls. of water, as you suggest. If you can get the fruitgrowers to use the other measures which you mention in connection with the spraying of trees, so much additional good will be secured. When the spraying is properly done with good apparatus the results are so satisfactory that our own orchardists very rarely adopt the more troublesome and more expensive remedies, such as banding and the removal of loose bark, or other precautions in the matter of fruit cases and barrels, all of which are, however, very useful and desirable.”

Mr. George Neilson, F.L.S., late curator of the Burnley Horticultural Gardens, Victoria, writing in reply to inquiry as to what he had done for this pest, says:—“My experience of spraying was a complete success. In 1893-4 the whole of the crop of apples was destroyed. During 1894-5 a thorough system of spraying with Paris green was undertaken, with improved, but not quite satisfactory, results. On the Paris green being analysed it was found to be highly adulterated. During 1895-6 Blundell's Paris green was used, and gave very satisfactory results; and during the past season there was saved from this destructive insect fully 96 per cent. of the crop. I am aware that it has been stated that it is of little use to spray trees for insect or fungus pests, but my answer to this is that by carefully following the advice given by Mr. Chas. French in his ‘Handbook on Insect Pests,’ the injury done by this pest can be reduced to a minimum. There is no doubt whatever in my mind as to the value of spraying, if carefully and consistently carried out. I used the Paris green at the rate of 1lb. to 180galls. to 200galls. of water. I commenced spraying as soon as the flower petals had fallen and the young fruit formed; a second spraying was given ten days after, and a third eight or ten days later,

care being taken to avoid spraying during strong sunshine, the work being done in the early morning and late in the afternoon and evening. This, with bandages periodically and carefully examined, will be the means of saving at least 90 per cent. of the apple crop."

Mr. T. W. Kirk, F.L.S., biologist to the New Zealand Department of Agriculture, wrote that there was considerable difference of opinion as to the value of arsenical spray for codlin moth, and if he had to choose *between* "spraying" and "bandaging and destroying all infected fruit" he would choose the latter, although it is certain they should be used in conjunction with each other. Experiments in New Zealand have shown that excellent results follow careful and systematic treatment on these lines. Spraying is undoubtedly of very great value, and must be repeated at short intervals in localities where the "grub" is bad. The bandages should be examined at regular intervals and the caterpillars destroyed. Some Tasmanian growers do this by passing the bandages through a clothes wringer, after which the bandages are replaced. For bandages he prefers strips of newspaper twisted and put round the tree, with another piece crumpled and placed in the fork. These are gathered at regular intervals and burnt at once, new bandages being placed on the trees. This is a cheap, efficient, and expeditious way of killing the caterpillars.

Mr. James Lang, of Harcourt, Victoria, a large apple-grower, writing in reply to an inquiry as to his experience with Paris green, said he had reduced his loss by fully one-half by spraying his trees four times, at intervals of from ten to twelve days, and is so satisfied with the result that this coming season he intends to spray six times, as he believes he will almost completely check the pest. Spraying must be continued up to the end of December to do much good. He used 1lb. Paris green to 150galls. of water, to which a little quicklime is added to prevent injury to the trees. He also bandages his trees, and traps a great number of caterpillars in this way. Picking and destroying all fruit showing signs of infection is also necessary. In regard to the question whether it pays to spray, he states he is confident that it does, provided the work is performed in an intelligent manner with proper appliances and standard strength Paris green. In 1896 he had 400 cases of "grub" eaten apples, while this year his loss was only 200 out of a total of considerably over 4,000 cases. In previous years he sprayed with Paris green twice, but found this insufficient, and last season was the first time he had been able to give the pest a decided check. Without any spraying he was sure he would have had scarcely half a crop of sound apples. His orchard is situated on the slope of a hill, and consists of thirty acres of fruit trees, twenty acres of which are apples planted from ten to thirty years, and are therefore average-sized trees, bearing from 6bush. to 10bush. per tree, odd trees bearing as much as 26bush. The spray pump is attached to a 50gall. cask and fitted with two hoses, so that, with one man to each hose and one to pump and drive the horse, two rows of trees are done at a time. It takes on an average one hour to charge and spray the contents, the three men doing the twenty acres of apples in two and a half days, working eight hours, and using about 1,000galls. of the Paris green mixture. The actual cost of four sprayings is as follows:—Two men for two and a half days, at 2s. 6d. a day=12s. 6d.; 6½lbs. Paris green, at 1s. per lb., 6s. 6d.; total, 19s. for each spraying, or a total of £3 16s. The usual rate paid here for young men is from 10s. to 15s. per week and keep. The horse, of course, is always on the place, so there is no extra expense for this. In order that the work may be done properly, Mr. Lang always accompanies the men, so that there are only two men's wages to charge; but allowing for wage for three men, allowance for horse, wear and tear, &c., he considers that £7 will more than cover the expense of spraying the twenty acres four times. Allowing that only 200 cases were saved, this shows a clear profit of £13; but

Mr. Lang says his spraying operation saved many hundreds of cases. In an orchard where no means are adopted to keep the pest in check it is only a matter of time for the whole of the crop to be affected. Many fruitgrowers, without giving spraying a proper trial, say it will not pay to spray, but he is convinced that any grower who takes up spraying with a determination to clear out the pest will meet with success.

Mr. W. J. Allen, the New South Wales fruit expert, writes that he has had considerable experience in California and Canada in dealing with the codlin moth, and is sure that with three or more sprayings with Paris green, careful examination of bandages once a week, and the picking of all infected fruit, nothing but the best results will ensue. He has never yet heard of a single case where any injury followed the judicious use of Paris green as a spray. To render it more insoluble it is advisable to mix about 1lb. of freshly slacked lime to each pound of Paris green, and allow the same to stand in about 8qts. of water for twelve hours, when it should be added to 200galls. of water for use.

Mr. Quinn, Inspector of Fruit, has tested spraying with Paris green of genuine quality, as proved by the Public Analyst, in a consistent manner at the orchard of the Parkside Lunatic Asylum. He sprayed every fourteenth day from October 23 until January 15, giving seven sprayings in all. The trees were old and stunted, having injured trunks, and only about nine trees out of nineteen treated bore a good crop of fruit. The stems of the trees were scraped and limewashed in winter and bandaged in November; twenty-nine bandages were used upon nineteen trees. The ground was cultivated under and around the trees. The bandages were examined at frequent intervals, and any fallen and infested fruits carefully gathered. Of the fallen fruits about one-sixth were injured by larvæ of codlin moth; on no occasion were more than twenty-eight larvæ found in the twenty-nine bandages. Unfortunately, as the earlier apples began to ripen, they were removed without permission by patients and others up to reaching height from the ground, but no persons were poisoned, so that this misfortune proved a source of instruction. In February the remaining fruit was gathered, carefully counted, and every fruit suspected cut open and examined; the proportion of sound fruits was over 90 per cent. of the whole. The Paris green was used at the rate of 1lb. to 160galls. of water, 10lbs. fresh lime, and the same weight of brown sugar being added to the mixture. From the trees in the same rows, which were sprayed several times in a hurried manner up till Christmas by the hospital attendants, not more than 50 per cent. sound fruit was taken at the gathering time, while the proportion of caterpillars found in bandages around their trunks were vastly more numerous: as many as twenty were counted frequently under those on one tree. Samples of the fruits which had been sprayed seven times with the strength of Paris green given above, and on which the traces of the lime could be plainly seen, were taken at once on being gathered to the Public Analyst, who stated, after testing same, that "No appreciable quantity of arsenic could be found about the samples," thus showing, as has been frequently proved in other countries, that there is no danger of poisoning, as the apples were tested very soon after being sprayed, and while so much of the mixture remained on the fruit as to prevent anyone eating them without first carefully wiping them.

A number of persons having ridiculed through the daily press and elsewhere the statements made by Mr. Jas. Lang, of Harcourt, Victoria, respecting the actual expenditure incurred by him in spraying twenty acres of apple trees with Paris green and lime solution for codlin moth, it may be of interest to fruitgrowers to state that Mr. Walter Sage, of Angaston, who is one of the most experienced of our orchardists in the use of the spray pump, has given

the cost of spraying thirty-seven acres of apricot trees once with winter strength Bordeaux mixture, as carried out by himself, as follows:—

	£	s.	d.
84lbs bluestone . . . . .	0	16	0
60lbs. lime . . . . .	0	1	3
One man's wages (three days), at 5s. per day . . . . .	0	15	0
Two boys' wages (three days), at 2s. 6d per day . . . . .	0	15	0
Total cost . . . . .	£2	7	3

The trees are of medium size, and bore 14 tons of marketable apricots last year. The spray pump was an old one which had been in use some years, and the method of using a hose on each side, as stated by Mr. Lang, was adopted.

In comparing these figures with those furnished by Mr. Lang, deducting in each case the cost of the materials, it will be seen that the respective costs for labor per acre are:—Mr. Sage, thirty-seven acres, 30s., or about 9½d. per acre: Mr. Lang, twenty acres, 12s. 6d., or 7½d. per acre. It must be remembered that while the individual apricot trees do not take so much time to spray as an apple tree of the same size in full bearing, every apricot tree has to be sprayed, while of the apples those bearing a small to poor crop, of which there are considerable numbers in every large orchard, require very little material, as the fruit alone requires spraying; consequently the average in each case would probably be nearly equal. The extra time, if any, required for spraying an acre of apple trees would be equalised by the lesser cost of the Paris green mixture as compared with the Bordeaux mixture, it being about one-third less.

## ORCHARD NOTES FOR SEPTEMBER.

BY GEORGE QUINN.

The ploughing or cross ploughing of the orchard should be completed as soon as possible, all weeds being turned under completely. In earlier localities the soil should be cultivated down to a fine tilth before the furrow lumps become set and hard, but in later situations the open ground will take in more rain.

The fruit trees are now starting into active growth, and this is a good time to work in quickly soluble manures, such as superphosphate and potash in various forms, sowing from 4lbs. to 6lbs. around the spread of the branches of each tree of fair size, just prior to using the cultivator.

Where recently-planted trees are budding out, more particularly those which have been cut back to a single stem to start the main arms, a careful overhaul should be given and intermediate buds rubbed out, so as to spread these branches good distances apart along the trunk, giving each main arm when grown a separate grip upon the main stem. The distance between each arm should approximate to 3in. A man can go over a great many trees in a day, and the after value in strengthening the trees more than compensates for the time spent. All growths starting below the grafts or buds should be rubbed out at once, so that no sap is drawn away from the desirable portions of the tree.

Where the sap is moving readily grafting may be started, and in a mild season like this a start can be made several weeks earlier. For large stems I prefer the bark graft, inserting several around the section; for instance, stumps from 3in. to 6in. in diameter should have from two to four scions inserted. The advantages of this method over the split or wedge graft is that the wood of the stock is not split, and consequently heals up without much danger of dry rot setting in, providing always that the wound is covered with grafting wax to exclude damp or dryness. For small stocks, say up to 1in. in diameter, the

whip and tongue graft is best. I will assume that the readers of these notes know how to cut the scions and stocks for insertion of these kinds of grafts, and how to bind up the same when fixed.

The planting of citrus fruits has been dealt with in a separate article.

Various pests will wake into activity during this month, and efforts should be made to check them. The Black Aphis of the peach and orange will soon become plentiful, and must be attacked at once with tobacco and soft soap spray or resin wash, following up the applications quickly to counteract the rapid breeding habits of these pests. The peaches can be treated at the crown of the roots with tobacco wash, 1 gall. to each tree at time of spraying. Take care when spraying for the aphides or scales to saturate every cranny and particle of twigs, leaves, and stems right down to the crown of the roots; this is the only way to make the work thoroughly effective. In early districts the summer strength Bordeaux mixture could be used by the end of the month, when apricot and peach trees have shed their blossoms. The strength is 5 lbs. blue-stone, 5 lbs. fresh lime (also 5 lbs. molasses in wet localities), to make 50 galls. of wash for spraying. There is every evidence of this being a damp, humid spring, and the fungoid diseases of the orchard will most probably be very active; hence I think the summer dressing will be distinctly necessary this season. Orchards in which codlin moth larvæ are found should be cleaned thoroughly during this month, as the moths will emerge in October. All apple, pear, and quince trees, and any other trees adjoining these sorts should be thoroughly cleaned of old bark, and the knotholes, &c., scraped out.

## NOTES ON PLANTING CITRUS TREES IN SOUTH AUSTRALIA.

BY GEORGE QUINN (INSPECTOR OF FRUIT).

The cultivation of the citrus family has been tried to a certain extent in nearly all the settled districts of South Australia; consequently a fair estimate can be made of the localities in which marketable fruits can be produced. The members of this family are nearly all natives of the tropical zone, and are therefore much averse to extreme cold and wet or frosts. I know that orange and lemon trees grow and fruit fairly well in some frosty situations, but the fruits of the orange are thick skinned, spongy, and lacking flavor. On the Adelaide plains as far north as Gawler and along the southern seacoast good fruits are produced. These are districts with a good rainfall and an equable temperature, most probably rendered so by close proximity to the sea. Along the River Murray and on the western slope of the Flinders Range, where the rainfall is very light, with irrigation splendid fruits are grown. The extreme cold and wet of the Mount Lofty Ranges, and the South-East, or the dry and frosty situations of the Lower North are not suited to the production of good oranges, lemons, &c., without elaborate shelters, which are outside the limits of profitable culture.

It might be said generally that a gentle slope is the best situation in which to plant citrus trees, because better natural drainage is assured, and in regions bordering on the cold limit—that is where three or four degrees of frost are experienced—an inclination towards north or east is preferable on account of the extra warmth obtained. If the position selected is not well sheltered by natural breaks, such as belts of native timber, sharp ridges of ground, &c., a breakwind should be provided at once. If a large area is being planted in an open spot an immediate break could be made in the form of high paling or galvanized-iron fences, inside which could be planted a living breakwind of trees

such as loquat, almond, sugar gum, pinus insignis, tree lucern, boxthorn, and others. In selecting the sort of breakwind tree I would strongly commend either almond or loquat, the latter for preference. Both of these will give some return



FIG. 1.

for the ground they occupy, and where oranges thrive well the loquat will fruit regularly.

Finding suitable soils within the mild areas mentioned above is a somewhat

difficult matter. Citrus trees thrive best in free loamy soils, with gravelly, well-drained subsoils. If the surface soil should be a heavy loam, containing moderate quantities of clay, and the subsoil be shaly, broken slate, through which water percolates freely, success is almost sure to follow in planting: but where a good free soil overlies a thick, cold, heavy layer of retentive clay the trees will be very short-lived, usually dying just as they come into good bearing. The best way to test the suitability of the soil for oranges or lemons is to dig holes here and there over the block for a depth of about 2ft. If, as in some parts of the Adelaide plains country, it consists of about a foot of good soil overlying about 6in. of stiff clay, beneath which a rubbly marl is found, then the intending planter can decide whether he will be willing to incur the expense of breaking through that layer of clay or putting

in drains, in which, if the slope be even and the rows of trees planted 20ft. apart, an underground wood, pipe, or stone drain should be put down between each row. If the fall in the ground runs obliquely across the general slope make the drains in that direction, keeping its course well away from the stems of the trees.

This practice is largely and successfully used in the other colonies, and I am confident in the course of a few years much of our land now deemed unsuitable for citrus culture will be planted to these fruits. The whole of the area to be planted should be broken and subsoiled to a depth of from 15in. to 24in., according to its free or gravelly character. The subsoil should be kept in its original position. Digging holes should be strictly avoided, excepting where the soil is extremely loose and well drained. Unless the ground has been impoverished by a preceding growth of orchard trees no manure should be placed in the ground at the time of planting. If the soil is poor a dressing of 3lbs. of bonedust could be mixed with the soil where it will not come immediately in contact with the roots of the young tree.

Unlike the conditions existing in the eastern colonies, all of our citrus plantations must be irrigated, and intending planters for market purposes should make an assured supply of good water one of the main

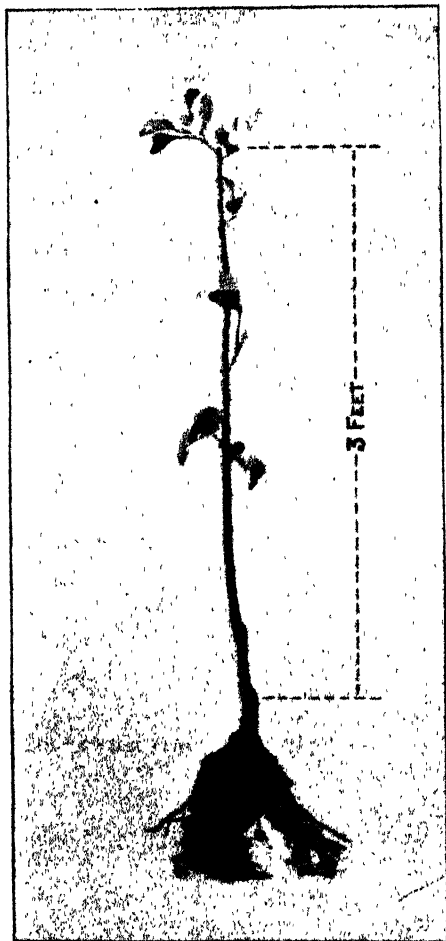


FIG. 2.

considerations before planting. It is very doubtful if water for which more than 6d. per 1,000galls. is paid can be used profitably in the production of citrus fruits in this colony.

Having secured to a fair degree all the necessary conditions of climate, situation, soil, shelter, and water, we must consider what to plant. Among the sweet oranges the Navels are most sought after, and from what I have been able to see of the Washington Navel in this and the other colonies, am of the opinion that it surpasses our Australian Navel. It bears earlier, more evenly, has a thinner skin, less "navel" inserted in the pulp, and the aperture of the umbilical mark is less prominent and less liable to split. St. Michael is a very fine orange, the best of ordinary types. Malta or Blood is also in demand. Parramatta is a favorite, but the fruits from young trees are likely to be puffy and thick skinned. The Oval China is so very near the Compuda in general qualities that they can be paired for selection. Rio is a good strong grower. Sabina is a finely-flavored thin-skinned variety. Siletta is a somewhat dwarfish, prolific, clustering fruited variety that is much in general favor.

In bitter oranges the Poorman and Flat Seville are both good for marmalade purposes, and no doubt in moderate quantities would be profitably grown. Of citrons the Bengal varieties are best, Knight's being less pulpy. Mandarin oranges are worth much more attention here than they have received, for in some parts of the colony they thrive and fruit freely, and there is very little doubt that fruits of excellent quality of these could be grown with judicious treatment on the Murray and along the western slopes of the Flinders Range.

The well-known Canton, Emperor, and Scarlet varieties are all good, but a new variety known as Dancy's Tangerine is of greater excellence, while this again is inferior to the Queensland variety, "Beauty of Glen Retreat." Of limes the West Indian, Paper Rind, and Tahiti are good, but not much in demand. In lemons there is not a great variety. The Lisbon is the best known sort, pretty well all the others being merely types. Eureka, Sicilian, and Villa Franca are, however, recommended, and the Variegated Lemon also has its advocates. The distances at which citrus trees should be planted from each other vary with the nature of the soil and the known habits of the varieties selected. Sweet oranges are nearly all strong growers in rich soils, and should, under such circumstances, be planted 25ft. apart; in medium soils 20ft. will be sufficient. Lemons require about the same ground. Mandarins and limes only require about 18ft. between the trees, and in poor soils the marmalade sorts and citrons could be planted a similar distance, but usually they require 20ft.

Having prepared the ground as indicated herein, the positions for the trees should be pegged out and the soil well broken and pulverised in those spots.

The older citrus growers in Australia have dearly bought their experience in regard to planting these trees, and now, instead of planting them on a level with or below the surface of the ground, as shown in Fig. 4, a mound is made varying from 6in. in height upwards, and from 4ft to 6ft. across, according to the porous nature of the ground. In localities where the drainage is not so good a higher mound is raised and *vice versa*. The tree is placed in the ground so that the soil-mark from the nursery upon the stem is on the top of the mound, as in Fig. 3; the base of the ball of earth enclosing the roots is just below the common surface of the surrounding orchard land. The advantage claimed for this method is that the trees are not so readily injured by water, and consequently do not suffer from "collar rot" to any great extent—a defect only too frequently met in the older-planted citrus groves of this and other colonies. In our illustrations Fig. 1 represents an orange and lemon tree which are fair types of trees as received from the nursery. The orange tree on the left represents a tree lifted carefully with a ball of earth attached to the roots, which is highly desirable, as then the tree receives no check in the shifting. The lemon tree on the right is a fair type of what is received by a planter residing a long distance from the nursery. From the ground-mark on the stem



to the top of the leaves measures 4ft. 6in. When the bagging is removed the soil falls away, and the roots are left bare, broken, and out of proportion to the top.

Usually the planter puts this sort of tree in at once, perhaps after clipping off a few damaged roots; the result generally following is that the young twigs



FIG. 3.

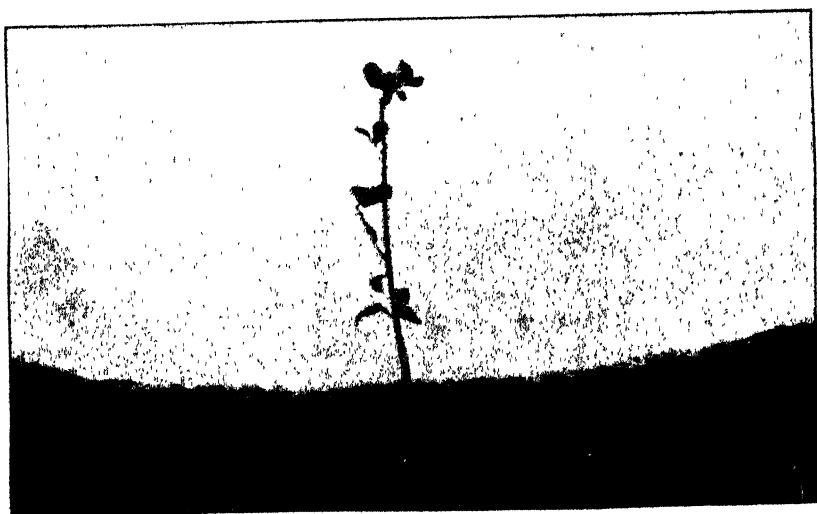


FIG. 4.

wilt, and the tree gradually dies back for a couple of feet. In the meantime, supposing that the tree lives, shoots come from the lower buds of the stem and a new set of branches are formed. It has been found by experience that if the tops be cut back severely, and the roots trimmed carefully, as shown in Fig. 2, these trees, when planted in spring or early autumn when the soil is getting warm and mellow, have every chance of recovering and forming good trees,

In the portions of South Australia indicated herein as having been proved suited to growing citrus trees transplanting should begin in spring (generally September), as soon as evidences of growth begin to appear, and may be carried on safely until the end of November. If water is available and the young trees have only to be carried a few yards, they may be shifted safely throughout the summer by a skilled man; but planting should be stayed from November until about the middle of March under other conditions, and then should be discontinued about the middle of April, as the trees moved later do not get a fresh root-hold before the ground becomes cold, and consequently may perish during the winter. All citrus trees should be well watered immediately on being planted, and any that have lost roots during the lifting should be staked. A mulch of loose stable manure spread around and over the mound—*but not against the stem*—will greatly assist newly-planted trees through the first summer.

## EXPORT OF FRUIT.

### Report on 1897 Season.

The following report, dated July 15, has been received by the Minister of Agriculture from Mr. E. Burney Young, Manager of the London Produce Depot:—

I have the honor to inform you that about 10,000 cases of South Australian fruit have been sent to me for sale this season, consisting of apples, grapes, pears, and quinces.

APPLES.—I append a list of the various kinds sent, with remarks against each. I have divided them into two classes, namely A, those of which five or more shipments have been made, and B, less than that number. I have placed them as far as possible in their order of merit, though in many instances it is extremely difficult to give their relative values when so few specimens have been sent and of many varieties there is little choice as regards their saleable qualities. Cleopatras and Dunn Seedlings stand out very prominently as the best varieties, and many of those of which only a few specimens have been sent are more saleable apples than those of which a number have been sent. Some very good class apples are not good travellers and have not realised as good prices as inferior varieties that are better keepers. The following is the list, the figures representing the highest price realised:—

A.—Cleopatra, 20s., very excellent; Dunn Seedling, 20s., ditto; Stone Pippin, 14s., clean fruit and very good traveller; Roman Beauty, 14s., fine apple, but requires very careful packing; Sturmer Pippin, 12s., good class, but specimens sent not the best; Strawberry Pippin, 13s., good class but not good travellers; Jonathans, 12s., good class but very bad travellers; Northern Spy, 14s., good class, but not good travellers; Reinette du Canada, 12s., inferior class and difficult to sell.

B.—Garibaldi, 12s., good saleable apple, good color; Fearn's Pippin, 14s., few sent sold well, good travellers; Five-crown Pippin, 13s., very good travellers; Blenheim Orange, 13s., good class, fair traveller; Ribstone Pippin, 13s., good class, but not best specimen sent; London Pippin, 16s., good traveller; Majetin, 12s. 6d., fairly saleable; Wellingtons, 12s. (or Dumelows), good class cooking apple; Taunton, 12s., fairly saleable; King of Pippin, 13s., few sent, good saleable apple; Scarlet Nonpareil, 8s., considered good class, but no good specimen sent; Beauty of Australia, 12s. 6d., fine apple, not very good traveller, very few sent; Hoover, 9s., high color, but wretched travellers; Shepherd's Perfection, 11s., one consignment only, fairly saleable; Raspberry Pippin, 12s., ditto; Rock Pippin, 13s., one consignment, nice clean apple; Bismarck, 11s., one specimen, fairly saleable; Adams Pearmain, 12s., ditto; Lady Henniker, 12s., ditto; Shockleys, 10s., ditto; Nick-a-Jack, 8s., second-class apple; Lady Daly, 6s., ditto; R. J. Greening, 9s., ditto; Ben Davis, 9s., ditto; Striped Beeffing, 7s., inferior quality; Gravenstein's, 8s., no good specimen; Boston Russets, 8s. 6d., ditto; Winter Quoining, 8s., ditto; Dutch Mignon, 6s., ditto; Spitzenberg, 7s., inferior; Pomeroy, 10s. 6d. (probably Cleopatra); Indian Winter, 4s., (probably same as Hoovers), very bad travellers.

I observe a very marked improvement generally in the selecting, grading, and packing of the fruit and the marking of the cases. Some of the shippers are to be highly congratulated upon the care and neatness shown. In some instances, however, the old faults of packing small and large fruit together, too much paper packing, and the inclusion of inferior fruit (some diseased) is still observable.

South Australian fruit is getting a good name on the market, and it is a pity that any fruit should be sent which tends to detract from this reputation. A considerable quantity of fruit has arrived over ripe. What the cause is I am unable to say. Either the fruit has been packed when too warm, taken too ripe, or not carried at the right degree of temperature—probably often a combination of two or all of these causes. But wherever the fault lies every effort should be made to remedy or avoid the defect.

**GRAPES.**—Messrs. T. Hardy & Sons' enterprise in shipping grapes last season has led to the shipment this season of further quantities by that firm and by several others, comprising Almerias or Dairas (red and white), Doradilla, Belas, and Muscat. Some of the early arrivals brought good prices, but the later arrivals, particularly those by the *Ballaarat* and *Oratava*, came in very bad condition, and were almost unsaleable. The following is a list of the prices obtained:—

Per *Arcadia*.—Doradilla, 22 cases, prices realised 5s. 6d., berries small, some wasty, color too brown; Red Daira (10), 20s.; White Daira (8), 20s.; Doradilla (19), 20s.; Daira (16), 20s.

Per *Austral*.—Doradilla (20), 3s. to 7s., very wasty, color not good; White Daira (18), 15s., do. (2), 7s., condition good generally, but a little wasty; Doradilla (12), 12s., variable, some fairly good, others wasty; Daira (2), 22s. 6d., sound and clean; do. (18), 15s., bunches that held well together; do. (3), 5s. 8d., wasty.

Per *Parramatta*.—Muscat (2), useless; Red Daira (7), 4s., very wasty; do. (1), useless; White Daira (24), 12s.; do. (1), 5s.; do. (1), 15s.; do. (5), 11s.; do. (9), 10s.

Per *Ophir*.—Belas Blanc (7), 2s. 6d., nice grape, very wasty; White Daira (2), useless; do. (18), 15s., condition fairly good; do. (15), 13s. 6d., do.; do. (2), 10s., do.; do. (20), 15s., do.; do. (1), 17s. 6d., do.; do. (30), 13s. 6d., do.; do. (14), 7s., wasty.

Per *Ballaarat*.—White Daira (50), 3s., condition bad, very wet and wasty; do. (20), 3s., do.

Per *Oratava*.—White Daira (50), 3s., condition bad, very wet and wasty.

The best packing for grapes, I am informed, and for all soft fruit is wood wool. I am making inquiries where it is to be obtained, and will send full particulars and samples. If not too costly it would be a splendid substitute for paper shavings for the apples, while it has an infinitely neater appearance.

**PEARS.**—A number of trial shipments have been made, consisting of *Beurre Clairgeau*, *Duchess d'Angoulême*, *Vicar of Winkfield*, *Winter Nelis*, *Swan Eggs*, *L'Inconnue*, *Burgamot*, *St. Germain*; the last named being a very large hard pear, and quite unsuitable for the market. With the exception of a few *Burgamots* sent by Mr. David Murray, which were perfect, and were used and much appreciated at the South Australian banquet, the experiments in this direction cannot be said to be a success, as very few arrived in a saleable condition. A few *Glou Morceaux* realised 21s., and two lots of *Vicar of Winkfield*, by the *Massilia* and *Ormuz* respectively, 12s. a case, and one case per *Massilia* 14s.

**QUINCES.**—Several trial shipments of quinces were made, the result of which was worse than that of the pears, as none of them were saleable, and I would not advise a repetition of the experiment, as the market is too limited to warrant the risk.

**GENERAL REMARKS.**—Shippers will find it to their interest to pay careful attention to the grading of their fruit and marking the grade, G. 1, G. 2, G. 3, clearly on the cases. Some shippers have done so most punctiliously, but others have not. A batten should be nailed across the lid of the case at each end to permit of a circulation of air through the stack, as it will tend to prevent heating in the centre and assist the ship in maintaining an even temperature throughout the cool chamber. A little more care might be taken by some of the ships in keeping the chambers at a more equable and desirable temperature, as some of the fruit has suffered from too great heat, while others again have been frozen in the same cargoes. This is particularly the case with the *Ballaarat* shipment; a great deal of the apples and all the grapes were very over ripe while some were frozen, but the company decline to admit any claims.

On the whole the South Australian shipments have been very good, and the prices realised have been from 3s. to 5s. a case higher than any other colonial fruit.

**GRAFTING WAX.**—All wounds on trees should be covered with grafting wax or other plastic matter to prevent access of spores, which cause gumming and decay. Best grafting wax is made by melting together four parts resin, one part beeswax, one part mutton suet. For grafting bandages it is usual to tear long strips of calico, say  $\frac{1}{2}$  in. or less in width, run them through the melted wax, and wind upon a reel or stick.

## NOTES ON FRUIT CULTIVATION IN THE EASTERN COLONIES.

BY GEORGE QUINN.

The Royal Horticultural Garden and School at Richmond Park, Burnley, Victoria, are amongst the most interesting and valuable institutions in Australasia. The garden was formerly under the control of the Royal Horticultural Society of Victoria, but the Government took it over some time ago and established in connection therewith a school of horticulture, where students could be instructed both in the theory and practice of orchard work. The curator (Mr. George Neilson, F.L.S.), by untiring perseverance, has raised this garden to the position of being regarded as the highest authority in the colonies in respect to nomenclature of the fruits grown in the temperate climates. It is true that only the most meagre opportunity has been given him in the small area of about nine acres of a soil which only varies from medium to very poor in quality to demonstrate many of the characteristics of the different varieties of fruits grown there, for most of the trees have to be planted 6ft. apart. Lifting and root pruning has to be resorted to about every second year to keep many of the trees within their allotted spaces.

The orchard is well cultivated, pruned, and clean of foreign growth. The trees are sprayed for fungoid diseases and insect pests, and here one truly recognises the great advantages to be gained in these operations by the low training system.

The pear and cherry slug is troublesome in its season, but hellebore powder used as a spray keeps it in check.

The destructive codlin moth is here also, but Mr. Neilson has for several years used Paris green spray and bandages, at the same time observing cleanliness to a scrupulous degree in all the surroundings; and he says there is no denying the results, and scouts the idea of Paris green being useless in helping to check this pest.

Over 800 varieties of apples are grown here true to name, but, in answer to a query, the curator says "A couple of dozens would serve all purposes and conditions in practical orchard planting." The following figures give the number of varieties of popular fruits grown in the orchard:—Apricots, 59; cherries, 114; figs, 79; currants, 38; gooseberries, 133; mulberries, 10; nectarines, 26; nuts, 22; oranges, 35; pears, 378; peaches, 183; Japanese date plums, 30; plums, 194; quinces, 16; raspberries, 29; strawberries, 62; vines, 219; walnuts, 14; apples, 807; blackberries, 10; lemons, 7; almonds, 12; limes, 2; loquats, 4; medlars, 4; shaddockes, 3; citrons, 2; guavas, 5.

Though large quantities of produce are taken per acre from these dwarf trees planted so thickly, it is not considered to be practicable in commercial orchard work, and students trained among these tiny trees would encounter many difficulties when cultivating stronger specimens growing upon rich soils. The extra time occupied in pruning, gathering crops, spraying, &c., would have to be considered. It is to be hoped that any of our Australian Governments, when starting standard orchards, will extend their usefulness beyond the possibilities at Burnley; for, besides being merely gardens of nomenclature, a new institution with larger areas of good land could test the qualities of the fruits as they are introduced before being distributed—grown as they would be grown on commercial lines. Suitable stocks for different varieties could be gone into more accurately, and various phases of pollination and hybridisation tested.

Nearly two years ago the Victorian Legislature passed a "Vegetation Diseases Act," and to meet the requirements of the regulations made thereunder relating to the importation of plants, fruit, &c., a disinfecting house was in course of construction at Burnley at the time of my visit, where all imported plants will be fumigated with hydrocyanic acid gas. When one considers the great numbers of insect pests in the orchards of Victoria this precaution would seem to have been taken at the eleventh hour, but when one learns that many destructive pests are existent in the neighboring colonies, which some chance may land within her borders, the wisdom of this preventive action goes unchallenged; and to those who clamour at the little inconveniences caused by such slight delays of disinfection I would suggest that they rather bear the ills they have than fly to those they know not of.

The orchards of New South Wales present to the southern visitor two strange features, viz., the immense area under orchard trees, and the large proportion of the same that are abandoned completely, or much neglected. It seems strange to a visitor that Dr. Cobb should have to hold the neglected and abandoned orchards of New South Wales up to the ridicule of the world, and at the same time little Tasmania sends fruits to Sydney and sells them at good prices. It also seems strange that New South Wales growers should wish to exclude Tasmanian apples with a few specks of *fusciadium* upon the skins, when one can travel for several days among their orchards and not meet a grower who appears to know the use of Bordeaux mixture. I think that the time is not far distant when the growers of New South Wales will demand that no orchard owner shall be permitted to keep trees that are a standing menace to his careful neighbour. With the exception of our very wet hilly country, the orchard lands of South Australia lend themselves very kindly to the careful cultivator: a fairly defined winter time, and an almost rainless summer give our orchardists opportunities to keep down foreign growths of weeds, fungi, and insects that are not known by our contemporaries in South Wales, where a heavy rainfall, humid atmosphere, and a showery summer are not unalloyed pleasures to the producers of fruit. I saw much in New South Wales to make me thankful that I did not own an orchard there, and I also saw much that awakened my admiration and gave me the desire to imitate.

The South Australian wheatgrower has apparently tried to do in the production of cereals what the New South Wales fruitgrower has also attempted in the orchard line, viz., take all he can from the soil and give nothing in return. In the one colony worn-out farms are plentiful; in the other abandoned and neglected orchards are abundant. I went into some of the orange-producing centres of New South Wales with statements fresh in my mind that "Sydney orange-growing was nearly played out," but I came away with a totally changed idea, and am firmly convinced that, given the same care as our citrus plantations receive—and it is slowly evolving into a system of "plant no more oranges than you can properly attend to"—New South Wales can produce an average orange that for firmness, weight, smoothness of skin, and good flavor cannot be approached by the generality of South Australian growers. In the Cumberland district the orange-growing industry has existed for many years. Many good local seedlings have been raised and are planted largely, and we who are accustomed to growing only named varieties look in vain for our familiar types; still there can be no doubt that wisdom is detected in keeping closely to that which thrives best in one's own particular locality. Mandarin oranges of various kinds, many of which are local seedlings, are grown and considered more profitable than sweet oranges. I certainly think this section is worthy of more attention amongst our growers. They have never been sufficiently general here to create a taste for them. In New South Wales and Queensland more are to be seen on dinner-tables than of the sweet

orange. In one plantation in Cumberland country more Mandarins are grown than in the whole of South Australia. Much of the orange land is of rotten shale, or slaty composition, naturally well drained. The roots do not penetrate deeply, and consequently when a drought comes, as it did last year, no means of irrigation exist, and the trees suffer severely. Such were the conditions under which I saw them. Very small quantities of manures of any sort are used, most growers preferring the humus raked up in the forests near by, which is scraped up in heaps, and the leaves, &c., allowed to decay before being spread over the ground around the trees. In some instances maize stalks are utilised as mulching. There seems in most orangeries to be an entire absence of the pruning knife; consequently blackened dead twigs make the trees look worse than they really are. I did not find collar rot an omnipresent scourge, as I had been led to believe was the case in Cumberland country. There can be very little doubt the absence of that forcing with manure and water, which is so characteristic of our orange-growers, goes a good long way to give the quality of fruit produced by those of New South Wales. The sweet orange is chiefly used as a stock, and some noticed upon the Japanese hedge lemon (*Citrus trifoliata*) were not a success, being extremely stunted. Many of the old orangeries are planted with layers propagated from proved seedlings. Owing to the lack of forcing referred to previously, trees forty years old only attain a height of about 20ft., and do not spread widely. Among named varieties known to us, the Siletta seems a favorite, and their dwarfish habit reveals their presence over many an acre of hillside. The further north one goes the more inferior the lemon becomes. I did not see a lemon in the eastern colonies to put our South Australian types to shame. In the better attended orangeries the trees are all planted high enough for the crown of the roots to be seen on the stems. Two other fruits which do well with us around Adelaide, but about which we seem in want of closer acquaintance, are the Passion fruits and Japanese date plums, or, as we erroneously term them, "persimmons." The former are grown acre upon acre in a manner similar to our trellised vineyards, and are said to yield handsome profits, and as all that we consume are imported, I think a moderate number of plants set out on a sheltered northern slope on the foothills about Adelaide would yield payable results under careful cultivation. The plants are easily raised from seeds, and begin to bear fair crops here in three years.

The Japanese date plums grow well around Adelaide, but seem very imperfectly understood. In New South Wales the taste for these fruits has increased, and they are eaten freely and exposed for sale in every fruit shop of note. It is certain that better varieties are grown there than here, and very profitably too. The plants grow to a fair-sized shrub, are deciduous, carrying the fruit upon the current season's growth. They are pruned regularly and severely, much on the lines of a grape vine—the previous year's growth is cut back to spur carrying from two to six buds. The fruits of the finer varieties are sweet, juicy, and agreeable to the palate, and do not leave the alum-like effect in the mouth which has done so much to prevent the locally-grown date plums getting a hold upon the public taste here.

Some growers state that it pays them best near Sydney to grow only very early varieties of apples, such as Lord Nelson, &c.; but it seemed strange that late varieties of Tasmanian apples could be sold in Sydney for 5s. per case and upwards in June, when local growers are empty-handed; and if this price would not pay New South Wales growers apple-growing must be more difficult than in our colony; and I think our magnificent red winter apples, such as Strawberry Pippin, Buncombe, Scarlet Nonpareil, Esopus Spitzenberg, &c., would find a more profitable market in Sydney than at home.

The codlin moth is found in the orchards, but is not regarded as being so

destructive as in South Australia. Bandaging and scraping the stems, with careful attention to gathering infested fruits, are the remedies adopted by the more careful cultivators.

Orange red scale (*Aspidiotus aurantii*) could be found in some orangeries, but I did not see it in such injurious numbers as in some of our orangeries, though it must be bad in some localities, as citrus fruits perfectly encrusted and unsightly with the scales could be seen exposed in refreshment rooms at railway stations around Sydney. Nevertheless, the orange-grower in New South Wales has his pests (and very severe ones they are) to hold in check. "Maori" is a vernacular term applied to the effects of a small mite (a species of *Phytoptus*) which so badly damages the rind surface that the oil cells collapse, leaving the fruit of a rusty brown color, quite disfigured, and repulsive to the eye. Spraying with sulphur and soft soap is largely practised for this pest, but doubts are expressed upon its efficacy. A sort of "black spot," apparently a fungoid growth, also does a lot of damage, making black sunken spots similar to those appearing after a hailstorm. Bordeaux mixture is recommended for this disease, but I could gather no evidence of its practical application.

The other fruit trees have their own diseases and pests, the cherry slug and apple and pear fusicladiums being troublesome. The former (the cherry slug) is one of the most injurious insects attacking fruit trees, and very fortunately we are yet free of this pest, as far as I can see or hear. I have seen cherry trees which, owing to its continued depredations, had made no perceptible growth for three seasons. The remedies are spraying with poisons such as the arsenites and hellebore powder when the slugs are seen at work: dusting with lime also destroys large numbers of the slimy larvæ. This pest is one that our Hills growers—whose cherries are, I believe, unbeaten in Australia—should keep a keen watch for to detect its presence should it be imported, so that efforts could be made to stamp it out at once.

The destructive fruit fly has been found over a pretty large area of New South Wales, but I came too late in the season to find the larvæ at work in the fruit pulp; but owing to the kindness of Mr. Walter Froggatt, entomologist to the New South Wales Agricultural Department, I secured mounted specimens of the fly, and examined at his study apples through which the maggots had tunnelled, and from which many flies had emerged and were clustering about the putrid pulp.

With the exception of the citrus tribe, the Japanese plums, and the date plums, the fruits grown in Queensland are not suitable to our southern climate. One can gather an idea of the immense variety of the citrus family cultivated in Queensland when over 120 named varieties and species are catalogued. Queensland is without doubt the home of the sweet orange and the Mandarin. I had not a chance of seeing any large plantations under these fruits approaching in area those of New South Wales, but when one could see such fine results obtained under adverse circumstances one can form a pretty fair estimate of what could be produced in this line were things more generally considered. The climate, rainfall, and soils seem all that could be desired, and only await the skill and knowledge which practice alone can bestow upon ordinary cultivators for the citrus fruits of Queensland to take the place they are by nature destined to take, and that is "second to none." It is indeed enough to rouse a southerner to enthusiasm to see a grove of Emperor and Scarlet Mandarin trees about 18ft. or 20ft. high and spreading in proportion, each bearing from six to ten cases of finely-flavored fruits as large as our medium-sized sweet oranges—fruits firm to the pressure of the hand, and of a most appetising flavor.

Some very fine seedling Mandarins are grown in Queensland, Mr. W. H. Parker's Glen Retreat groves being responsible for one named "Beauty of Glen

Retreat," which is proclaimed by competent judges to be the best Mandarin in the world. I saw a number of these in fruit at Redlands Bay, but unfortunately the trees were so badly infested by the destructive white scale (*Chionaspis citri*) that the characteristics of the tree were not displayed. Mr. L. G. Corrie, whose knowledge of citrus fruits and love of their qualities has bestowed upon Queensland growers many fine introductions from abroad, describes the tree as "an upright grower; thornless; fruit late in ripening; medium to large size; very fine high color; heavy and solid; small plump seeds; rind thin, never more than 1/8 in., close fitting, but easily separated from the pulp, so that when fruits are well grown the sections show as ribs; flavor sprightly and delicious; scarcely any 'rag' around the pulp or between the sections." The only Mandarin grown in South Australia approaching this in any respect is the "Dancy's Tangerine," which is much smaller. The Washington Navel at four years of age produces fruit with a rind like a thick paper and as smooth as a pear, but the color is a pale sickly orange tinge, the umbilical mark not nearly so pronounced as in our Navels of this or the Australian variety.

I also had the pleasure of seeing "The Jaffa" orange growing, which Mr. Benson declares to be the true variety. It certainly answers to the description, having an upright strong growth, no thorns, large leaves and distinct secondary leaves, the fruit elliptical and fairly large. This very fine variety, I believe, is not yet introduced into South Australia.

Many good seedlings of the sweet oranges are grown in Queensland, and several brought to the Intercolonial Fruit Show in Brisbane by Mr. Jones from Rockhampton were of good quality indeed.

The "insect pest" question is the problem that must be faced if Queensland is to become the fruit-producing colony that nature seems to have intended, for in no country is the fact more clearly illustrated that where climatic conditions are suited to the free production of certain plants they will also be conducive to the rapid multiplication of the parasites feeding upon such plants. The warm humid climate of Queensland makes that colony the happy hunting ground of the seeker after scale insects. The soft succulent growth of its native flora, and the presence of indigenous fruits or introduced plants bearing fruits that have become acclimatised along highways, watercourses, &c., such as guavas and oranges, will prove an additional stumbling block to the eradication or even checking of insect life dangerous to fruitgrowers. Among the insects noticed, the wax scale (*Ceroplastes ruber*) was most prominent around Brisbane, where trees and shrubs were disgustingly blackened with the soot fungus growing upon its excreta. This pest is apparently omnivorous, and its introduction to our colony upon ornamental plants should be debarred by all possible precautions. The red scale (*Aspidiotus aurantii*) does not seem to be so injurious to orange trees in Queensland as in the drier portions of southern Australia. The general reason given was that "the trees grew away from it," but the statement that they breed all the year round, if true, would seem to me to be a clue to their comparative innocuity, the constant breeding weakening the insects and reducing their productiveness. In South Australia young healthy citrus trees seem to show fewer signs of injury from this scale.

In Queensland the most serious attacks noticed by me were upon young newly-infested trees, which were almost destroyed. I had an opportunity of collecting specimens and observing the growth of the small scarlet fungus (*Microcera coccophila*), which grows upon or from beneath the shell or puparium of the red scales. The successful introduction of this fungoid growth into South Australian orangeries is scarcely to be considered practicable, as our dry summers and cold winters would most probably prevent it existing. The most destructive scale, and most dreaded by Queensland growers of citrus fruits, is



undoubtedly the white scale (*Chionaspis citri*). In an old neglected plantation at Nudgee the trees presented a similar appearance to the effects of throwing ashes over the foliage, fruit, and stems just after a rain shower. The fruit was ruined, and the trees almost so.

At Redlands Bay a number of fine young Mandarin trees were simply encrusted, and all growth arrested by this pest.

*Aspidiotus ficus*, a large round ebony-black scale, about twice the size of the red scale, was found encrusting upon some of the trees, and promises to be a great source of trouble. The Maori was also very abundant and injurious, the browned surfaces before described being covered over with minute cracks.

The fruit fly is without doubt the pest of pests, attacking almost everything from oranges to even grapes. "The fruit fly or the fruit industry must go upon the Downs" was an expression used at the recent fruit conference by an old grower in that locality, and it would seem that the statement is quite accurate, judging by the accounts given to me by many growers.

No definite plan of coping with it has yet been devised. Spraying or trapping seemed quite useless, and destruction of infested fruits appears to be the only remedy. The insect, by depositing its eggs beneath the skin of the fruit, prevents all possibility of destroying the larvæ at the outset by spraying.

The Queensland orchardists are beginning to see the necessity for using preventive measures for all insect pests, and I was somewhat astonished to be questioned closely about the methods of fumigating with potassium cyanide, adopted by me in testing this treatment for red scales in South Australia. They are determined to give it a thorough trial in some parts, and I have no doubt of its beneficial results.

Queensland is rich in useful parasitic insects as well as in injurious ones, but with one or two exceptions their efforts are not very noticeable. The small ladybird (*Cryptolæmus montrouzieri*) is found doing useful work upon some of the softer coccids, and they are importing these beetles into New Zealand with a view to suppressing the mealy bugs in vineries, and might very properly be introduced by some of our owners of conservatories, for I think the mealy bug of our greenhouse plants, coleus, &c., would be strongly attacked if not suppressed by it.

The Japanese plums grown around Brisbane thrive well, making most luxuriant growth. The pruning adopted is very similar to that applied to the cherry trees by our best growers.

At the fruit show held in connection with the congress of intercolonial fruit-growers many fine varieties of fruits were seen which could be added to our South Australian collections with advantage, amongst the most important being oranges, date plums, apples, and pears. A patent spray pump, with an attachment by which kerosene could be mixed by pressure in the chamber of the pump with water drawn up from the barrel and ejected through a spray nozzle, in the proportions indicated by the adjustment fixed at the inlet of the kerosene, was shown at work by the inventor, Mr. W. S. Williams, of Doncaster, who is a practical citrus-grower in a large way, and says it is a perfect method of keeping down scales, &c. Mr. French, the well-known entomologist, says that this method of applying kerosene does not injure the trees, and saves the waste and time of making kerosene emulsion.

In closing this somewhat scant account of a trip which was most enjoyable and profitable, I beg to acknowledge the kindness shown to me by the officers of the Agricultural Departments of Victoria, New South Wales, and Queensland, as well as many growers from each of these colonies, and thank them for the trouble they took in placing me in the way of seeing orchards and gathering information about matters of interest to fruitgrowers.

## THE ORCHARD ORIOLE.

### A FRIEND OF THE ORCHARDIST.

BY FREDK. COLEMAN, TUELA, SADDLEWORTH.

At the last monthly meeting of the Gardeners' Society, says the *Register*, some members thought efforts should be made to introduce natural enemies to the codlin moth, &c., but Mr. Tepper said the only effective natural enemies to such nocturnal insects were bats and small insect-eating birds. Unfortunately those had been killed off in the moth-infested portions of the colony. In connection with this may I suggest to the Zoological and Acclimatization Society that an attempt be made to introduce into our fruit-growing districts the Orchard oriole, *Icterus spurius* (Linn.), a bird well known all over the middle parts of the United States—a bird whose preference for the orchard is so manifest that it takes its name from this circumstance. In the June number of *Harper's Monthly Magazine* there is an article upon this bird, under the title of "A Gentleman of the Orchard," by F. Ingersoll, who there says—"Although by no means a dandy, like the Baltimore oriole, he is every inch a gentleman, and wears his neat dress of crimson and black with an aristocratic air. Yet he is not above work. No bird is more ceaselessly active, and none is a better servitor of the agriculturist; for, from his first arrival in May until he joins small companies of his fellows for the southward journey in October, he is untiring in his pursuit of just those insects that the orchardist most dreads.

"A quarter of an hour's watching of one will satisfy anyone of his rightful claim to our admiration and thanks. He flies to a branch, moves his head from side to side, spies a canker-worm, trusting—vain hope!—to its color to hide it on the green surface of a leaf, and pounces upon it in an instant. Then a nest of tent-caterpillars catches his eye, and he attacks it furiously, tearing apart the shreds of silk, and greedily devouring every one of the writhing and horrid mass of worms—a meal few other birds will undertake. Even that does not satiate him, and he restlessly renews the search for those creeping larvæ of insects so desirable to him and his family, and many of which are so hateful to the farmer.

"The gaiety that marks all his actions characterises his song. Finding its pleasure and profit in familiarity with men, this oriole makes its home almost exclusively in orchards.

"Wilson says this songster may be easily reared from the nest, and in confinement becomes very tame and familiar."

Quotations might be made from John Burroughs, that minute observer and lover of bird life in the States, confirming the excellent high-bred character of the orchard oriole.

## THE WINE INDUSTRY.

BY W. KIMBER, CLARE.

South Australians generally, and the vinegrowers particularly, are watching with very keen interest every fresh development that takes place with regard to the success of the young wine-making establishments that have sprung up since the planting boom. The more sanguine anticipate much assistance from the South Australian Wine Depot in London, and it is satisfactory to note the very able and successful manner in which Mr. Young, the manager, pushes the wine business,

In this district we are very fortunate in possessing a wine company which means to do its best to help the industry. The directors of the Stanley Wine Company are sparing neither expense nor labor in endeavoring to provide storage capacity for the ever-increasing crop of grapes.

There are complaints among our growers about the prospects for sale of grapes, but generally speaking these complaints are laid by those who do not trouble to visit the cellars.

The company have ordered from England sufficient staves from which will be manufactured vats of a capacity of 750galls. each, which, with present vats, will allow of making 60,000galls. of wine next vintage. Additional fermenting vats are also being constructed.

It is most satisfactory to note that already the wines of this company are coming very much into favor. The holding capacity of the cellars is at present about 150,000galls. Altogether the vinegrowers in the Clare district are to be congratulated for having in their midst a company which, if properly aided by the growers themselves, will steadily but surely pave the way for a successful issue for all concerned.

## THE VINEYARD.

### NOTES AND HINTS FOR SEPTEMBER.

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

#### The Soil.

The *second ploughing*, in rationally-cultivated vineyards, should be brought to a close comparatively early this month. The objects aimed at in this operation stand in marked contrast with those required of the winter ploughing. The latter carried out on a deep furrow leaves the soil in a rough, open condition, giving free access to air and rain; the former, on a more shallow furrow, attempts to diminish the surface irregularity, which now becomes interrupted only by the slight alternating rises and depressions corresponding respectively to the rows of vines and the closing furrows. The latter lays bare the roots of the vine to the inclemency of the winter weather; the former, on the contrary, against the scorching heat of the summer sun, throws over them a thick coating of loose earth. The soil that has been broken up early, well weathered by atmospheric agents, crumbles away under the concave mould-board of the spring plough into a fine tilth, in which lay buried the weeds that rains have brought up. Thus at the threshold of summer the vineyard should be covered over with a thick, clean, loose layer of soil, well permeated with moisture, and capable of maintaining good healthy growth, if occasionally scarified in summer.

It has been stated that the second ploughing should be given on a shallow furrow. Deep ploughing, given in spring, when the sap is circulating freely through the tissues of the plants, has usually injurious effects upon the vines. The root fibres which are then in rapid process of formation are torn about and destroyed to the manifest distress of the plants. Given a first winter ploughing to a depth varying from 6in. to 8in., the depth of the second should not exceed 3in. to 4in.

The levelling down of the soil and the formation of a fine tilth, initiated by the second ploughing, is completed by the scarifiers. The latter should be set to work whenever a crust forms on the surface or the development of weeds renders it necessary. In vineyard or orchard the harrows should always be tabooed, as they show too great a tendency to consolidate the soil;

they need only be called into requisition when, through some mishap, the soil remains lumpy and coarse after the second ploughing; and even in this case the cultivators will usually do equally good work.

### Grafting.

Vines should be grafted rapidly, or else the rise in sap will become too strong to allow of a successful joining of the scion. Comparatively shallow grafting, about an inch below the surface, cannot be too strongly recommended; the grafts should then be mounded over with loose soil. Wherever this practice was followed out last season it gave rise to excellent results.

### Sulphuring.

As soon as the vine-shoots attain 4in. to 6in. in height it is advisable to sulphur them freely to check the early development of the oidium fungus.

## THE BEEHIVE.

### NOTES AND HINTS FOR SEPTEMBER.

#### BY APIS LIGUSTICA.

Although rather late, there is every promise that this will be a good season for beekeepers. A steady flow of honey began in August, and this, with fine weather, has enabled bees to push on with brood rearing. The colonies are now rapidly increasing in size, and the young bees may be seen in considerable numbers on a warm day taking their first flights. The appearance of the yellow flowers of the Cape marigold should warn the beekeeper that the busy season is at hand, and that there is much necessary work that must be done without delay. Swarming, the most interesting event in bee life, may be expected to take place towards the end of this month, or even sooner; and there is nothing more aggravating to the beekeeper than for a swarm to come out and be lost because no preparations have been made to receive it. With modern methods swarming can be prevented entirely, but it is doubtful whether many apiarists would care to do this, because of the pleasurable excitement always attached to the natural increase of hives. Mr. Langstroth truly wrote, "The swarming of bees is one of the most beautiful sights in the whole compass of rural economy." As a rule swarming does not take place until the whole country is yellow with the Cape marigold; but the fact that in some hives bees are even now getting crowded for room shows the necessity for having all things in readiness.

It should be clearly understood that the old queen goes off with the first swarm, and therefore the importance of properly hiving it if the queen is a valuable Italian.

It is impossible to tell from external appearances when a colony is going to swarm; the only plan is to open the hive quietly and look for queen cells on the combs. This examination should be made during fine weather, and, if queen cells have been started, the apiarist can then form some idea as to when a swarm may be expected. A queen cell is sealed nine days after the egg was laid, and as a rule a swarm will come out the day after the cell is sealed. The simplest way to start bees working in a movable comb hive is by allowing a swarm to run in at the entrance. The swarm after it has clustered should be taken in the usual manner in a clean box or tin dish, and the bees poured out on the ground in front of the frame hive. A board should be arranged sloping up to the entrance, so that they can crawl into their new home. In order to cause the bees to build straight combs in the frames it is necessary to give them a

guide to work upon. A good plan is to fasten a strip of comb foundation to the underside of the top bar of each frame in such a way that it will form the commencement of the centre of the new comb; or, which is better at this season, the frame may be completely filled with a sheet of comb foundation, when the bees will much sooner complete the comb, and no drone cells will be built. To prevent the combs breaking down when filled with honey it is well to lace a thin wire through the top and bottom bars of the frames in such a way that the wire shall be embedded in the centre of the comb.

Hives should now be carefully examined and their condition noted in a book kept for the purpose. Select a fine warm day for this examination, and take the opportunity of cleaning off all dirt, &c., that may have accumulated during the winter. Should a colony be found queenless, unite it with an adjoining one that has a queen. Also see that every hive contains an ample supply of food, as bees require large quantities of honey, pollen, and water when engaged in rearing brood rapidly. If a colony is found to be short of honey give it a frame of sealed honey taken from another that can spare it. This frame should be placed in the centre of the brood nest.

This is a good time to purchase bees in box hives and transfer them to movable comb hives. There is no better practice for a beginner than assisting at the operation of transferring. When moving bees in box hives the box should always be turned upside down, as there is the much less likelihood of the combs getting broken down in transit.

## POULTRY.

### DISEASES OF POULTRY.

By D. F. LAURIE, POULTRY EXPERT.

As the majority of failures on the part of inexperienced poultry-rearers are due to diseases, it may perhaps be well to define a few, and mention some remedies. Except in very rare cases it may generally be said that diseases of poultry are due to want of proper attention. This, of course, is a broad term, but at the same time it applies to these cases where want of knowledge, dirt, improper and insufficient feeding are potent causes. Your scientific practical poultry breeder never troubles himself about disease. Inherited diseases cannot altogether be guarded against; even experts fail in many cases to note signs more or less clear on purchased stock. It may be accepted as a general rule that a bird which has been a severe sufferer from any disease is sure to transmit the same to his or her progeny, either directly or indirectly. This is a fact not generally recognised by poultry-breeders; as a rule it is against their interests; nevertheless the fact remains, also the consequences. One may start with perfectly healthy stock in every respect, but if these are immured in insanitary surroundings even the toughest constitution must have a limit. The most common diseases of poultry are those of the mucous membrane of mouth, nostrils, and windpipe. The ordinary name for all the various forms of disease consequent on such affections is roup. A convenient name truly. If each suffering bird were branded "filth and neglect" it would perhaps so shame the owners that it would be conspicuous by its absence. I have read all I can procure on this subject, but no one (that is no competent medical expert) has given the matter due attention. My experience points strongly to the idea that this so called roup is typhoid in character. As in the human being, the disease is precipitated in the case of a patient living in an insanitary condition if subjected to a sudden chill. This roup, as it has for years been called, has been the scourge of all poultry yards, yet it is very easily

guarded against. House your birds in well-ventilated quarters, feed on sweet wholesome food, and above all do not expect your stock to thrive on filth. Those who wish to succeed will do so. In all diseases prevention is better than cure. Still there are cases where the unwary have purchased diseased stock, or stock bred from diseased birds. As a cure for roup I may mention the following, after first giving a few of the symptoms:—Roup may be divided into two classes. First, there is the severe lingering form, the result of bad feeding and insanitary surroundings, or it may be from actual inheritance. Secondly, the result of neglected colds or chills caused by wet weather, or housing in draughty places. The ultimate result is the same. In the first case the birds become drowsy and dull, with an offensive discharge from the nostrils, the eyes are inflamed, and the mouth is often full of a thick glairy offensive matter. Fever is generally very apparent, the plumage is harsh and ruffled, and the bird exudes an unpleasant odor from every pore. This is a well-developed case. Without any doubt, if the bird is other than a show bird, it should be destroyed. Its progeny will certainly be tainted. This is a fact not generally accepted, but true all the same. The second case of neglected coughs and colds will, if not promptly checked, arrive at a similar state. What is the cure? Well! I think enough has been said to prove that it is a case of stamping out, not patching up. A grave charge has been levelled by unthinking persons at pure-bred poultry. They assert that all poultry diseases are due to them. We are acquainted with similar assertions on all subjects with which those gentlemen who desire to air their what? (ignorance) love to give vent to. The term "pure bred" is only strictly applicable to that specimen which at the same time is perfect in every outward as well as internal point. A sick fowl, however well bred in every point, cannot win in good company. A winner must be in the pink of health and condition. Roup in all its stages can be cured, in the earlier stages without appreciable detriment to the progeny. This is not so in advanced cases. One has to buy experience. I once arrested the progress of this disease by an original method. There were about 1,200 birds in the collection, and many were affected. I obtained a sickle well sharpened, and promptly decapitated every sickly-looking bird I saw. The scourge was checked. I am at all times prepared to prescribe the usual remedies; some of the ingredients of the pills are peculiar. One thing as a cure I can recommend, and that is: get a tub of warm water, add a disinfectant, such as carbolic acid, or some coal tar by-product, and with some soap give the bird a thorough good washing, dry the feathers and place before a good fire; this is a well-tryed cure. I am constantly answering a great many letters concerning diseased poultry, and the question often presents itself to me whether or not I should prolong the agony of such ill-attended birds. One thing I can confidently state to such poultry-breeders as have families, and that is, that any neglect and filth on their part may rebound and result in bereavement. Diphtheria is a common disease in this colony as regards poultry, and is often associated with roup; and unfortunately there is evidence connecting outbreaks in human beings with disease of a similar nature in poultry. It has been proved beyond all doubt that the disease is transmissible from the human patient to the bird. This is quite sufficient ground to urge scrupulous cleanliness in all matters of stock. No one need take alarm over this matter, for the orderly person has little to fear, while the careless one perhaps does not care. The fact that this so-called "roup" is often allied with liver disease, a form of tuberculosis, causes me to refrain from suggesting cures, which after all are only methods of alleviation. Among a good many of our principal breeders my opinions are well-known on this particular subject, but it is out of question that they will be universally adopted. Liver disease I have just alluded to—an equally fatal ailment—I shall deal with, perhaps, on a future occasion,

## THE DAIRY.

The importations of dairy produce into Great Britain for 1896 amounted in value to the enormous sum of twenty-four millions sterling, of which £15,340,000 was represented by butter, £2,500,000 by margarine, and £4,900,000 by cheese. The average values of these products were: Butter, £5 1s per cwt.; cheese, £2 3s. 8d. per cwt.; margarine, £2 14s. per cwt. Denmark sent 886,554cwts., an increase over the previous year of 100,900cwts. Sweden sent about 300,000cwts.; Germany, 100,000cwts.; United States, 142,000cwts. Canada does the bulk of the foreign trade in cheese, sending nearly 1,250,000cwts. to Great Britain last year.

Cows about to calve, and for a week or two after calving, should be put under shelter at night, and have access to shelter at any time they desire to avail themselves of it. Before calving do not feed them too much, and avoid rich stimulating food. After calving the supply of food should be plentiful and nourishing. If the weather is very cold at night the cows should be covered with rugs, especially if not housed.

A mischievous idea has been expressed in several quarters with respect to dairy cattle. It has been stated, quite correctly, that rough, ill-bred mongrels withstand hardship and privation, whilst the finely-bred superior cattle die of starvation during periods of drought. But there is not sufficient profit to be realised from the average mongrel cow, although it must be admitted that occasionally a mongrel may be a good milker and a profitable animal. Every dairyman should weed out the unprofitable cows, keeping only the best, and improve the progeny of these by the use of a pure-bred bull selected from a reliable dairy breed. To avoid the otherwise inevitable loss of these superior animals during the frequently-recurring seasons of drought, it is necessary that a large provision of silage and other fodder should always be maintained. In "bad seasons" this fodder will be worth a great deal.

## LIVESTOCK NOTES.

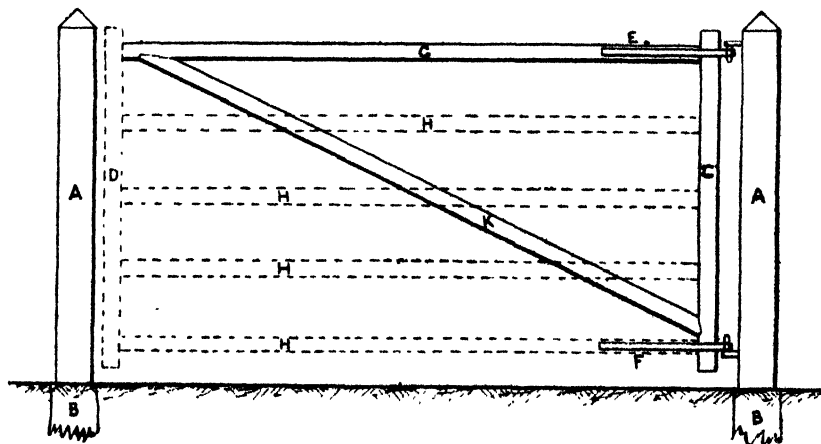
**TICK AND LICE.**—The advantage derived from dipping sheep is gradually becoming recognised by sheepowners. Even those who say they only find a few tick occasionally on some sheep recognise the improved condition of the wool, as the animal's time is not taken up in biting and rubbing itself; the wool is cleaner, and the animal more contented. It is advisable perhaps to note the requirements of the regulations under the Stock Diseases Act, 1888. Owners of sheep infected with tick and lice should give notice in writing to the Inspector. It is imperative that all sheep infected with tick or lice should be dipped immediately after shearing, and the owners must, within fourteen days, send written notice to the Chief Inspector of Stock, Adelaide, stating the date of dipping, medicine used, and the number of sheep dipped. This notice is most desirable, as naturally in times of economy the staff is small in number, and it enables the Inspectors to know who are fulfilling the regulation, and the number of sheep dipped shows the Inspectors where the work is not done, and is a guide by which they can visit those parts of the country where neglect is apparent, to enforce the regulation. The Inspectors finding sheep infested can require them to be dipped without delay. A most important order is that owners shall not allow infected sheep to stray on public roads, lands, or reserves, nor leave any if travelling, and any person travelling infected sheep without permission is liable to a penalty. More particular attention should be directed to the prevalence of lice, and the "dip" medicine should be

stronger, as this parasite is not so easily destroyed as the tick, and is much more destructive to the wool. In making a dip it will be found that the most economical is one 40ft. long, 5ft. deep, 2ft. 6in. wide at the top, sloping down to 8in. or 1ft. at the bottom. The length of this dip ensures the animal being immersed for a longer time than is frequently allowed. In fact many of the sheep are so short a time in the dip that it is labor lost, as it does not kill the parasite. Double draining yards should receive the sheep, to contain at least fifty sheep each (100 is better), so that one lot will drain whilst the second yard is filling. The yards by which the sheep are led up to the dip should be made so that the sheep will run up singly on to a slope at the side of the dip, not the end, and drop in, thus doing away with the old system of hauling and throwing the animal into the dip, against which they struggle most heartily, often to their injury. Every care should be taken in mixing the "dip." Carelessness is frequently the cause of sheep being killed and of the parasite escaping.

## FARM AND OTHER GATES.

BY THE EDITOR.

From time to time inquiries have been made and suggestions forwarded to the Central Bureau with respect to the construction of farm gates, &c. The greater number of the designs furnished have shown considerable merit, but some at least possessed weak points. There can be no real saving in building a gate which will get out of order within a short time when four or five shillings more spent upon proper hinges, &c., will provide a gate which will last for half a century. The essential parts in a well-made gate are the



"hanging stile," (marked C in drawing), the top "rail" or "bar" (marked G), and the "strut" (marked K). Another essential is that the *weight* of the gate shall be supported by the lower hinge (F), the upper hinge (E) serving to restrain the gate from dropping away from the post.

The lower end of the strut (K) should be joined to the lower part of the hanging stile (C) as shown in drawing, and the upper end of the strut should be let into the top rail or bar (G) in the same way, and *not* affixed in any way to the dropping stile (D), as this would tend to thrust outwardly instead of supporting.



The dotted lines (D and H H H) show respectively how the rest of the gate should be attached to the essential parts.

The gate-posts should be strong, and be put upright deeply into the ground. It is well to have the underground portion of larger size, so as to give a good hold; fill in with concrete by preference, or at any rate use brickbats, or limestone, or coarse gravel, and ram it down thoroughly. In setting up the posts (A A) it is well to use a plummet. If round posts are to be used a few saw cuts and an adze will readily square up the portion above ground, and will make a neat job of it.

By reversing the bolt of the top hinge it is made difficult for animals to lift the gate; and to prevent them opening it two latches or bolts could be used—one near the top and the other near the bottom.

The bars or rails should be morticed into both the hanging stile and the dropping stile, then well wedged, and secured by pins or pegs driven through the stiles and ends of the bars.

## THE FARM.

### SEASONABLE NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL ROSEWORTHY  
AGRICULTURAL COLLEGE.

### Fallow Crops.

During this month farmers who grow fallow crops will be busy with the preparation of the soil for the reception of the seed. A fallow crop, properly so called, allows of the cleaning of the land during its growth and leaves the soil in good heart for the succeeding cereal crop. A summer crop can be made an exhausting crop if it be not manured and be carted off the land to be fed to stock or sold. For example, maize sown broadcast without manure for forage, and cut and carted off the land when ready, would impoverish the soil in proportion to the bulk of the crop approximately. It would not rank therefore as a fallow crop, inasmuch as the land could not be cleaned during its growth; neither could it be cultivated, and the succeeding crop would suffer from its effect. If, however, the maize were drilled and well manured the crop could be horse-hoed and kept clean, and the residual effect of the manure would be appreciable on the succeeding cereal crops. It would then become a fallow crop, and if it were made, say, into silage, and the silage consumed on the land, it would be a fallow crop in the full sense of the word, and, except in dry districts, the cereal crop succeeding it would be heavier than after; for example, a bare fallow unmanured. A fallow crop considered by itself should not be expected to return a direct profit: it is grown to lessen the expense of the cereal crop succeeding it. Bare fallow and wheat alternately will gradually reduce the fertility of the land until a kind of equilibrium is reached, in which the plant food in the soil made available during the fallowing and during the growth of the crop will suffice for a mediocre crop. Against such crop rent or interest on the land for two years has to be charged, in addition to the cost of working, and only a medium crop results; but when fallow crops are grown and manure used the land receives even more working, and is enriched, more especially if the crop be fed on the land. The succeeding crop becomes a full crop, in many instances nearly double that after bare fallow, without manure, and as the fallow crop goes a long way to pay for itself the wheat crop starts with a relatively small debit against it, and, yielding more heavily, becomes altogether more profitable. The fallow crops suitable for one or other of the districts of South Australia are these—mangels, kale, rape, white mustard,

maize, sorghums, and millets. In last month's notes it was stated that it was unadvisable to practise summer cropping where the average rainfall was under 16in., and it may be further indicated that in districts where the average rainfall is less than 19in. or 20in. and greater than, say, 16in. fallow cropping can only be practised on part of the fallows. It seems a useful practice in such districts to summer-crop fallows intended for hay and bare fallow preparatory for wheat. In the drier districts it may safely be advised as the best practice to bare fallow for wheat; crop once in three or four years and keep sheep.

Of the fallow crops mentioned above the mangel crop is one of the most valuable; but only few of our farmers are fortunate enough to be situated in districts where the mangel can be profitably grown. In the South-East, in many districts, it may be grown extensively with great advantage; and in the hills districts here and there it is remunerative on a smaller scale. In the South it is grown to be fed down with sheep, and enables the farmers there who are alive to their opportunities to place fat sheep on the markets at a time when they are frequently scarce, and to secure top prices. Where dairy cattle and pigs are kept it is worth the effort to grow mangels if the conditions of the district at all offer inducements. One leading landowner in the Tanunda district lately informed me that his mangel crop last year, dry though the season had been, was of the very greatest value to him for his pigs. By means of his mangels he has been enabled to keep his pigs going well, and to take full advantage of the exceptionally high prices which have lately been ruling. He grows the crop every year without irrigation, and appreciates it very highly.

The winter cultivation preparatory for mangels, as for root crops generally, should be deep, and the land should be well manured. Ploughing 8in. deep early in the season and ploughing back 6in. deep now is not by any means too heroic; and twenty loads per week of farmyard manure, or its equivalent in artificial manures, is not too heavy a dressing. Unless the crop can be handsomely treated it is better to leave it alone, for it requires so much work by way of hand-hoeing and horse-hoeing, and such thorough cultivation throughout, that a medium crop is unremunerative. The farmyard manure should be spread on the land and ploughed in, but artificial manures should be broadcast on the land and worked in by the operations necessary to secure the requisite deep tilth. A part of the artificial manure may be drilled in with the seed to give the plants a better start.

It is good practice to apply both farmyard manure and artificial manure. From 8 tons to 10 tons per acre of the former, and of the latter, say, 1cwt. sulphate of ammonia or nitrate of soda, 1½cwt. superphosphate, and 2cwts. common salt per acre. Where farmyard manure is not available a useful dressing of artificial manures might be made thus:—Two hundredweight sulphate of ammonia, 2½cwts. superphosphate, 2cwts. common salt.

Such a dressing will cost about £2 per acre. To many it will appear extravagant in the extreme, but experience will teach them that it is really relatively a light manuring for this crop. Indeed I would say that the crop is so ravenous of manure and so grateful for it that it will be found to pay better to use even more than this amount suggested than it will do to apply less. In the one way with thoroughly good preparation of the land and careful after cultivation, in suitable districts, a very heavy crop may be grown; in the other, only a middling or a light crop, say 12 tons to 18 tons per acre. Let it be understood that, where the conditions are suitable, 25 tons to 30 tons per acre can readily be grown, and 50 tons per acre have been grown in more than one district of this colony, and that mangels for dairy cows and pigs are worth from 4s. to 6s. per ton, and the manuring suggested will not be challenged as extravagant. To put the case otherwise, let me say that 350 sheep may be

fattened on twelve acres readily. Crops have been grown in South Australia that would have carried 400 sheep for a week in the course of fattening. For such men as have conditions of climate and soil suitable for the mangel it will be found a remunerative fallow crop.

When the land has been worked into a fine deep tilth by the cultivator and harrows the seed may be sown in drills, from 24in. to 28in. apart, at the rate of 2lbs. or 1½lbs. per acre. Some farmers in the South-East sow even less so as to lessen to cost of thinning. The seed should be steeped for, say, two days in water, to which a little urine has been added, and thereafter very carefully mixed with some artificial manure, to allow of its being sown sufficiently thinly with the ordinary cereal drill. When it comes up, as each seed capsule carries three seeds, of which two generally grow, it should be thinned by hand, and one plant pulled out from each double. At the time this is being done the blanks may be planted with some of the plants lifted in thinning. Where the crop is grown to be fed down with sheep, even this thinning may not be necessary if the seed has been sown sufficiently thinly and regular. Nevertheless, I believe it would be profitable to thin regularly.

The after-cultivation of mangels is very important, and, as it is a fallow crop, not only should it be horse-hoed as often as required, to keep between the rows clean and the soil open, but it should also be carefully hand-hoed once or twice.

Mangels are much relished by all classes of stock. Horses thrive and show a nice thrifty coat when given a few pounds a day with other food. Cattle and pigs do exceedingly well on mangels, and for dairy cattle they have the additional merit that, unlike turnips or rape, or even kale, they do not appreciably flavor the produce. The roots may be lifted in autumn and stored (1) to allow of the land being cleared for wheat, (2) to give a most useful food-stuff for the cows for the barest time in winter. In pits or heaps a few feet broad at the base, and 3ft. or 4ft. high, and of any length, covered with straw, the crop may be conveniently stored. When the crop has been fed down with sheep a shallow ploughing or cultivation with a chisel-tined cultivator and harrowing will give a useful seed-bed for wheat. As the land is worked very deeply and heavily manured, and as it has ample time to consolidate during the growth of the crops, and as a result of the horse-hoeing, it will readily be admitted that a most favorable condition of things for the wheat crop will prevail, and that the crop may fairly be expected to be very heavy. Mangels are sometimes planted in autumn, but in districts adapted for the crop I believe the spring seed time is altogether preferable.

Kale may be sown in autumn with the first rains in beds and transplanted later, when the land has been well manured and worked, in districts in the Lower North and South. It will give some forage in early summer, but it is not much wanted at that time, and therefore it will be found better to run the sheep through it to feed it down lightly, so that the stalks are in no way damaged and some of the leaves left. It may then be horse-hood and left for the summer, when it will shrivel back somewhat, but with the first rains in the autumn the crop will come away luxuriantly, and if the autumn be favorable the crop will yield a large quantity of forage at midwinter, when such food-stuff is most acceptable on the farm. In the South-East it may be sown now in drills 32in. apart very thinly on land well manured; indeed, dressed very similarly to that already mentioned for mangels. In the summer, if sufficiently thinly sown, say 8ozs. or 10ozs. of seed per acre, it will require horse hoeing and working much as was indicated above for mangels. It will give in autumn and winter very valuable sheep forage.

Rape is another fallow crop which may be mentioned alongside kale. Cultivation and manuring for it is much similar to that for kale, only rape is sufficiently widely drilled at 16in. or 20in., and it should be sown much more

thickly. Good reliable seed could be drilled at 1½lbs. to 2lbs. per acre, and in the South-East (for which district it is more particularly adapted) may be sown now or earlier. It forms a very excellent and fattening forage crop for sheep, and when it has been well treated will yield a very heavy return of forage. On the College Farm it, as a rule, does not succeed. In 1889—a very wet year—we grew it successfully, but in average years it is less suitable than kale.

Maize is less suited to the drier districts than sorghum, but in the hills districts it is probably the best fallow crop, generally considered. It is more palatable to stock than sorghum, at least until the seed is beginning to form in the latter; it makes most excellent silage; comes early; and offers from successive sowings a succulent forage throughout the summer, more especially if a little irrigation is possible. It gives a deeper yield of milk from cattle fed with it than does sorghum, and its only drawback is its tendency to make the dairy produce somewhat soft. The common practice is to sow it broadcast and very thickly. Maize should be cultivated in the richer soils and sorghum in the less rich.

The soil should have been cultivated deeply, as for root crops, and well manured. Although the grain is large, a fine tilth is nevertheless of great advantage for its successful germination and vigorous start. Of manure it requires less when grown for forage than for corn, but in South Australia it is very rarely indeed grown for the grain, and there seems little likelihood that it ever will be grown for this purpose. Even for forage it seems preferable to grow the crop in drills, for (1) the forage is most valuable weight for weight, as the growth is more natural than when grown so thickly; (2) the cultivation and cleaning helps the crop and the land. The drills should be from 24in. to 36in. apart, and from 50lbs. to 70lbs. of seed per acre should be sown. As a suitable dressing of artificial manure I would suggest 1½cwt. sulphate of ammonia and 2½cwt. superphosphate per acre. This would cost upwards of 30s. per acre, and might be increased or diminished according to the condition of the soil.

Some sorghum will be sowed this month, but October—the first fortnight thereof—will in most districts be found a more suitable time.

## MISCELLANEOUS ITEMS.

### MARRAM GRASS.

It is of some importance to know that at the Hawkesbury Agricultural College, New South Wales. Principal J. L. Thompson has been growing the Marram grass very successfully upon sandy soil. This farm is at a considerable distance from the coast, and until now it had been considered by many people that the Marram would only grow within the influence of the sea spray. The rainfall is much greater on the Hawkesbury than in most of our inland districts, but it would be worth while to try experiments upon loose sandy soils by sowing the seeds, which can be procured in Adelaide at a cost of 2s. per pound, or much cheaper by importation in quantity from Germany. Stock will eat this grass readily when in a young state, but should not be grazed until established two or three years.

The good effect this grass has in stopping the sand drift can be seen in this colony at Corny Point and Normanville. Some five years ago the Bureau obtained a few roots of this plant and of the creeping spinifex from Newcastle, and handed them over to the Marine Board for trial at Corny Point, where the drift sand was causing much damage and expense. The plants did well, and the Marram especially fully realised expectations and in consequence, the

following year one ton of roots was obtained from Port Fairy. The head keeper reported in June, 1897, "That as a means of staying drift sand its value cannot be over-estimated; the more sand the better the growth. Cattle and horses eat it when young and tender. The more it is cut or eaten off the more it spreads." At Normanville, Mr. G. H. MacMillan imported plants from Mr. S. F. Avery, borough ranger, Port Fairy, Victoria, some four years ago, and planted the same according to Mr. Avery's directions. The grass has thrived so well that during the past two seasons a lot of transplanting has been done, with the gratifying result that what a few years ago was barren shifting sand and a source of much trouble is fast being covered by this useful plant.

**KAFFIR CORN.**—The Department of Agriculture introduced from America a small quantity of Kaffir corn (Dhurra, or *Sorghum vulgare*). This included the so-called Red Kaffir corn—a variety of the common Dhurra—and the old and well-known white kind. The new red variety is said to be more hardy and prolific than the other; and, from seeds introduced by the Agricultural Bureau in 1896, some very good results have already been recorded, samples of which may be seen at the Bureau office. A few packages of seed of both varieties remain for distribution to farmers desirous of experimenting, and can be secured if quickly applied for. Applications by letter must be accompanied by stamps to value of 8d. to cover cost of postage.

**USE OF PHOSPHATIC FERTILISERS.**—In the *Journal* of the Agricultural Bureau of March, 1897, p. 249, an error occurred which Mr. Krichauff has been desired to correct. He misunderstood Prof. Maerker, who had written recommending "a combined use of Thomas phosphate and superphosphate." He did not mean "a mixture," but that the superphosphate should be used at the tilling, whilst the Thomas phosphate should be applied to the soil earlier—in autumn or winter. Mr. Krichauff adds that lately Prof. Maerker and others recommend also a top-dressing with Thomas phosphate, and it is generally acknowledged that the best way to use phosphates (especially Thomas phosphate) has been by no means finally settled.

**SCALE INSECTS.**—The large black scale insect which infests olive trees, orange trees, and some other plants may be destroyed by first spraying the tree with water and then sprinkling *new* air slaked lime all over it. The same effect can be produced with fine fresh wood ashes sprinkled upon the damp foliage. The orange round scale cannot be touched with these remedies, and the only effective agent, so far, is the resin wash. If scales and aphides are treated with resin wash they soon disappear, and the "fumagine" or "sooty fungus" will go with the insects. This fungus propagates quickly upon the "honeydew" or excreta voided by the scale insects and plant lice. The resin wash should be applied three or four times at intervals of ten days during the summer, when the young insects are most rapidly produced. Never spray very cold mixtures, nor whilst the sun heat is great.

**COW PEA (*DOLICHOS SINENSIS*).**—Last year the Central Bureau distributed for the Department of Agriculture a quantity of seed of this valuable fodder plant for trial in South Australia. In America this plant is very largely cultivated, both for fodder and as a green manuring crop. For fodder the crop is used either green or as hay, and the ripe seed is also largely used for stock. When the pods are young they can be used as a substitute for kidney beans, and the ripe seeds are often used as haricot beans. In New South Wales this plant has been very successful at the Wagga Experimental Farm and elsewhere; and in spite of the severity of the season a number of favorable reports were received by the Bureau last season from farmers in the Lower North and

South of our own colony. Farmers would do well to try this plant on the fallows, as being a legume it will enrich the soil in nitrogen for the following crop. The seed should be sown in drills about 2ft. or 2ft. 6in apart, the plants being 1ft. to 1ft. 6in apart in the rows. The land should be hoed between the rows two or three times before the plants begin to run over the soil.

**ROOT WORMS.**—Within the last few weeks the Davenport (Port Augusta) Branch forwarded roots taken from a peach tree which had died from no apparent cause. On examination the small roots were found to be covered with gall-like swellings, apparently caused by insect attack. These roots were forwarded to Dr. N. A. Cobb, of the New South Wales Department of Agriculture, who reports that the swellings were caused by the attacks of Nematode worms (*Tylenchus radicola*), a very serious pest. Unfortunately there is no reliable remedy for this pest, which also attacks the roots of numerous plants. During past years specimens of onions from Magill and elsewhere, oats from Penola and other places, were all attacked by these and allied worms. The water-blisters on potatoes is also due to this pest. Practically all that can be done in combating this must be directed to preventing its attacks by ridding the soil of the worms, putting obstacles in their way, or so reducing their numbers as to mitigate their ravages. This can be done by using some chemical such as quicklime, gaslime, potash, ammonia, superphosphate, &c., or by trapping by means of catch crops, famine, or planting gall-proof varieties. In the *Journal* of the Bureau for August, 1896, page 15, will be found the substance of Dr. Cobb's recommendations; and in the May, 1897, issue will be found some notes from report by Miss E. A. Ormerod, F.R.M.S., &c

## FARM PRODUCE REPORT.

Messrs. A. W. Sandford & Co. report:—

August 31, 1897.

During the past four weeks the weather throughout the agricultural districts of South Australia has been very favorable, with the exception of a few rather sharp frosts, which further retarded the growth of feed and crops, so that the season is in many parts at present about a month later than usual. Appearances render it probable that the effects of good cultivation will be very evident during the coming harvest, the late rains in poorly-tilled places bringing along the weeds to such an extent that the young wheat plant will be very much choked out, rendering it probable that in some of the districts large areas will have to be cut for hay. The event of the month has undoubtedly been the excited condition of the breadstuffs market in the northern hemisphere owing to the damage done to crops both in Europe and America, and values have advanced to a price which has not been touched for some fifteen or sixteen years past. The opinion seems to be growing that the improvement in price is likely to be of a permanent character, the consumption of wheat throughout the world having apparently overtaken the increased supply. It is to be hoped that our farmers will this season reap a good harvest, as price is likely to be high, offers of 40s per quarter for South Australian wheat, f.o.b., Port Adelaide, for November shipment, being already made, although during the last day or two the unavoidable reaction after the sharp advance has been shown, but only to the extent of a shilling or two per quarter, and those in the trade look for early recovery; the lateness of the season, however, will compel our millers to further import, probably from Riverina, where sufficient stocks are yet held, to carry us over till harvest. Millers' offal lines, owing to the small quantity of wheat being treated, continue to rule relatively much higher than in Victoria and New South Wales markets. Chaffcutters are also paying high figures for hay, but a few weeks must see a considerable tumble in this line. Feeding grains have fallen 3d. to 4d. per bush. in Victoria and New Zealand, so that values here are also easier. Stocks of potatoes are becoming very low in the South-Eastern district; importations, therefore, are being resumed, chiefly from Ballarat and Tasmania. Onions have further advanced, but the market is being kept supplied by stocks in one hand at Mount Gambier.

Wheat, 6s. 2d. to 5s. 4½d. on trucks, Port Adelaide.

Flour, £12 16s. to £13 5s. for best roller.

Bran and pollard, 1s. 2d.

Oats selling from 3s. 3d. to 3s. 5d. for New Zealand white stout feed: local dun, 2s. 10d. to 3s.

Gambier potatoes, £4 4s. to £4 7s. 6d. at city railway station; Ballarats and Tasmanians, duty paid on wharf, Port Adelaide, £4 10s. to £4 15s.  
Onions, delivered Adelaide, £10 10s. to £11.

#### DAIRY PRODUCE.

In butter our colony is yet hardly self-supplying, a few small lines of lower grade pastry butter having to be imported, but before the end of September some surplus will be available, although it is not likely that exportations to Europe will then be resumed, as Barrier and West Australian orders will doubtless have preference. We are daily realising more fully the extensive losses amongst the herds during the late protracted drought, and it appears that in some districts where dairying had begun to be developed they will hardly produce sufficient butter even during spring to fill local wants, and it must take two or three years in those places to restore the position. Values have steadily fallen during the past month, but prices are yet 4d. or 5d. above export values; therefore further easing must be looked for during the next few weeks, especially as prices intercolonially at moment are relatively much below South Australian. Eggs consistently dropped towards usual spring rates, but supplies are very short, partly caused by unusually heavy local consumption in consequence of the high ruling price of meat; as Sydney, however, is freely offering at 7½ per dozen, and filling orders to Western Australia which are usually executed from this port, we expect to see an early reduction here, although at present the value is firm. Of course, the setting in of hot weather, shortly to be expected, will again give this market control in the line for Western Australia, past experience having shown our neighbors there that long-distance carried eggs during hot weather do not turn out well.

A scarcity of the raw material has sent bacon higher, but we reckon top price has not even yet been reached. Cheese is also an advancing line, and as local stocks are nearly exhausted prices must improve up to imported rates. Honey has been selling somewhat better, and the usual brisk demand experienced for beeswax, although value at the moment is a shade easier. Trade in almonds has been quiet. High prices have ruled for carcass meat and poultry, everything forward realising very satisfactorily to producers, and the future in these lines justifies us in recommending farmers to give them some attention. Latest selling rates are as follow:—

Factory and creamery fresh butter in prints, 1s. 1d. to 1s. 2d.; farmers' separator, dairy, and good store lots, 1s. to 1s. 1½d., an unusually narrow margin covering these lines; a few odd boxes only of stale and mixed lots sold for pastry at 1d. to 2d. lower. Imported bulk pastry lines are realising 9d. to 10d. Eggs, 11d. to 11½d., clear extracted honey, 2½d. to 3d.; dull and candied lots, 2½d. to 2¾d.; beeswax, 1s. Factory cured sides of bacon find brisk sale at 8½d. to 9d.; good farm hitches, 7½d. to 8½d. Favorite brands of cheese, 8d. to 9d.; dry and old to medium sorts, 5d. to 6½d. Almond kernels, 6d.: soft shells, 3d. to 3½d. Dressed fowls, 5½d. to 6½d. per lb.: turkeys, 8d. to 8½d. Good shop porkers, 6d. to 6½d.; medium sorts and good baconers, 5½d. to 6d.; vealers, 2d. to 3d. In live poultry good roosters realised 1s. 9d. to 2s. 4d. each, prime heavy birds to 2s. 10d., ducks, 2s. 2d. to 3s.: pigeons, 6d. to 7d.: turkeys, 6½d. per lb. live weight for medium-conditioned birds, up to 8d. for prime table sorts.

#### WEATHER AND CROP REPORT.

ARTHURTON.—We are having splendid weather. The crops are looking very well, more especially those drilled in with manures of a good quality, some of which are making rapid growth. A great many experiments are being made with the different kinds of manure in this locality, so that farmers will be able to form a very good idea which are the best. There has been great mortality amongst cattle, horses, and sheep, shortness of feed and sand being the causes. The grass is coming on slowly. We want a good downpour to fill the tanks and dams. Rainfall for year, to August 17, 8'465in.

BARROOTA WHIM.—Rainfall for six months ending June 30 only amounted to 3'800in. Cereal crops are looking fairly well, but are not so forward as usual. Feed is coming on well, and stock are improving in condition. Generally the prospects for the season are not too favorable.

BORDETTOWN.—About 2in. of rain have fallen during the month; greatly improved the prospects of the district. Crops are backward, but coming on well, and the grass is growing nicely. Stock are improving in condition. There is but little water in the dams, and a wet spring is needed.

CALCA.—During the month light showers have fallen almost daily, keeping the crops going nicely. A special feature of the season has been the almost total absence of thunder and frost.

**CHERRY GARDENS.**—The weather during past month has been very favorable to the growth of vegetation, though heavy frosts have occurred in some parts of the district. The crops are looking well, and cattle generally are improving in condition.

**CLARE.**—We have been favored with exceptional weather during the month—comparatively free from frost, with sufficient warm weather and light showers. The crops show nice growth, those drilled in having come on very rapidly. Rainfall for July, 3.980in.; August, to 23rd, 2.510in. There is a fair amount of food, and stock generally are improving in condition.

**COLTON.**—The past month has been exceedingly dry, and every one is anxiously looking for a good downpour, as crops and grass are at a standstill. The lambing season is over, and the result is very disappointing. The drop is not more than 10 per cent., and the wild dogs, which are trooping in in great numbers, will probably finish those off.

**GAWLER RIVER.**—The weather could hardly have been more favorable than it has been during the past four weeks, and the crops are making good headway and look very promising. There is a general complaint about weeds in early-sown crops, and this will reduce the yield. The drilled crops are looking much heavier than those broadcasted with or without manure. A good fall of rain is required to fill up tanks and dams. Feed is coming on nicely in most places. There will be only a small percentage of lambs this year, but the sheep and lambs are now doing fairly well.

**GLADSTONE.**—During July 3 190in. of rain fell, giving the soil the best soaking it has had for three years. Rainfall for August, to 20th, 1.095in., and still showery. The weather generally has been very favorable—warm days with rain at intervals and no frosts; consequently the crops and feed are making good progress, though some are very lirty.

**HINDMARSH VALLEY (PORT VICTOR).**—The season was very late in breaking up, but since May 24 more than 11in. of rain have fallen, and there has been but little frost, and absence of heavy washing rains. The crops are rather backward, but healthy. Up to date only 15.000in. have fallen, against an average during past five years of 25.000in. to same date.

**KADINA.**—The season's prospects are not very cheering, owing to the absence of a good soaking rain and prevalence of dry winds. Neither wheat or grass are making much growth, and unless we get really good late rains the harvest will be light. Many sheep, principally lambing ewes, have died and most of the lambs. Heavy losses of horses from famine and sand have occurred. Generally the season has been the worst ever experienced here.

**KANMANTOO.**—We had during the second week in August the best rain experienced here for over two years, considerably over an inch falling in twenty-four hours, with heavy rains since. Crops look well and healthy, though late grass is very backward and thin, the rains being too late to give any chance of a good grass season. Much of the best grass has been destroyed by the stock eating them out to the roots.

**LUCINDALE.**—Since previous report the weather, with exception of last week, has been all that could be desired, there being sufficient rain with absence of frost. Crops and grass are coming on well. Sheep are doing well, although large areas of grass land are under water. Complaints are constantly heard of foxes killing the young lambs.

**MAITLAND.**—This month has been so far very favorable for the crops. Nice showers have fallen constantly, never letting the ground get dry, and the days have been fairly warm, so that feed is growing nicely, though all kinds of stock are very weak and poor in condition. Meat of all kinds is very scarce, and the shearing, which will begin next month, will show very different results to the last. Rainfall at Kilkerran since July 21, 2½in.

**MEADOWS.**—The splendid rains that have fallen during the month have almost assured a good season in this district. Stock are generally looking well.

**MINLATON.**—Generally the farmers are well satisfied with the prospects of the crops, but are of opinion that good heavy rains in September and early in October will be necessary to ensure a good crop. The rains since May have been sufficient to keep the crops growing, but have not saturated the subsoil. Some of the farmers have made a mistake in leaving their land rough, as the drill leaves it in ridges. Crops invariably do better (in dry seasons especially) if the land is levelled off with harrows or chain, and, if lumpy, rolled before the crop comes up.

**MOUNT BRYAN EAST.**—The wheat crops are coming on fairly well, but more rain is much needed. Stock are beginning to improve, but losses have been very heavy, and sheep are still in very weak condition.

**MOUNT COMPASS.**—The month has been very wet, with heavy frosts. Cattle are in fair condition, but many horses are very poor and weak. A large area has been planted with onions, and a fair number of fruit trees and vines are being planted.

**MOUNT GAMBIER.**—Feed is now growing very well, and should the present showery



weather keep up during September and October it will be almost a perfect season. A good deal more land is under crop this year, and the young crops are coming on nicely, the early sown covering the ground well. Grass, too, is making a good show where allowed fair play. Stock are beginning to pick up, and young lambs look especially well.

**MOUNT PLEASANT.**—The crops are progressing favorably, the weather being very seasonable, there being sufficient but not too much rain for hills districts. Stock are generally improving, but there have been many deaths, amongst horses especially, this being most unusual in this district.

**MUNDOORA.**—Owing to the lateness of the rains the crops are backward and fairly dirty, even on the fallowed land which was well worked. Some crops are nearly choked with noxious weeds. A very large area is being rolled in preparation for hay crops. Should the weather continue favorable a fair average will result.

**PINE FOREST.**—Since last report we have had nice steady showers, and the wheat in some parts is making fair growth, though others are backward. Feed is still close and growing slowly. Farmers generally have turned their stock on their crops. About 400 horses have died from sand and starvation. Rainfall since previous report, 0 700in.

**NANTAWARRA.**—Nice seasonable weather was experienced during July, and with the warmer days crops and feed are making fair progress. The drilled crops keep ahead of those broadcasted.

**PORT GERMEIN.**—The crops generally look well, but more rain is wanted at an early date.

**PYAP.**—The wheat crop is coming on nicely, though thin in places owing to the ravages of cockatoos and to the difficulty of covering the seed properly on the ploughed land. Stock are improving slowly; there have been only a few losses from the drought. Rainfall for July, 0·577in.

**RIVERTON.**—The weather has been very favorable during the past month, nice soaking rains having fallen and the days being warm. The crops are looking well, and there is very good prospect of a good season. Rainfall for July, 2·785in.; for August, to 14th, 1·500in.

**SADDLEWORTH.**—Though the rainfall for July—2·650in.—is more than half an inch above the average, the crops, except where manured, are still backward, but healthy. The late-sown wheat is much cleaner and promises well. Fallowing is nearly finished. The suffering and loss of stock, especially dairy cattle, has been very great. Rainfall for seven months 7·450in., against an average for seventeen years of 11·208in. For August, to 20th, 1·880in.

**STANSBURY.**—We have had fine rains, and the wheat is growing well, especially the drilled crops. Feed is not very plentiful, but the warm weather being experienced will bring it on nicely.

**STOCKPORT.**—The weather is all that could be desired for growth of vegetation. Crops look fairly well, though very weedy, and feed is fairly plentiful. Rainfall for July, 1·440in.

**YANKALILLA.**—During the past month we have had splendid rains. Old residents say that so far it has been the best season for a number of years. The crops are looking well. Farmers who have used artificial manures for the first time report that on the land where it has been drilled in with the seed a marked difference is already noticeable.

**PORT BROUGHTON.**—The weather has been very suitable and the crops are looking well, though they do make very rapid growth. Feed does not make much headway, and more deaths of horses and cattle have occurred. The practice of drilling seed in with manure is being tested, and a considerable area will be sown in this way next year.

## AGRICULTURAL SOCIETIES.

### DATES OF SHOWS.

Royal Agricultural and Horticultural, September 9, 10, and 11; Balaklava and Dalkey, October 1; Belalie, October 13; Booyoolie, September 29; Burra and North-Eastern, no show to be held this year; Colton, October 27; Gawler, September 15; Kadina, October 6; Kapunda and Light, September 29; Kingston, October 21; Lucindale, November 3; Millicent, October 27 and 28; Moonta, October 13; Mount Barker, second Thursday in March of each year; Mount Gambier, October 20 and 21; Mount Pleasant, March 18; Naracoorte, September 22 and 23; North-Western, September 1; Orororo, November 3; Petersburg, October 27; Port Pirie, September 15 and 16; Port Wakefield, September 22; Robe, October 14 and 15; Snowtown, September 8; Stanley, November 4; Southern, November 11; Strathalbyn, October 7; Tatiara, October 29; Virginia and Port Gawler, October 7; Wooroorra, October 13; Yankalilla, Rapid Bay, and Myponga, November 6.

## CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, AUGUST 2.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir S. Davenport, Messrs. W. C. Grasby, Thomas Hardy, H. Kelly, W. F. Snow, and A. Molineux (Secretary).

**Branch at Forest Range.**

The formation of a Branch at Forest Range was approved, with the following gentlemen as members:—Messrs. J. Vicars, S. Collins, G. Monk, H. Caldicott, J. Fry, jun., A. Green, J. Green, R. M. Hackett, R. Townsend, J. Sharpe, H. Walters, C. Rogers, J. Moore, C. Stafford, and W. Cherryman.

**Congress.**

The SECRETARY reported that papers upon the following subjects had been promised for Congress, viz.:—"Dairy Cows and Milk Yields," by Professor Lowrie; "Fodders of Hills Districts," by Mr. W. Pearson, of Meadows; "Breeding Lambs for Adelaide Market," by Mr. J. Davey, Yorketown; and "Cider Making," by Mr. Krichauff. The following subjects have also been submitted for discussion, viz.:—"Nomenclature and Export of Apples," "Manuring of Vegetables," "Agricultural Science ('lasses,'" "Fruit Pest Regulations," and "Portable Presses for Baling Straw in the Paddocks." The Commissioner of Crown Lands (Hon. L. O'Loughlin, M.P.) had promised to deliver the opening address, in place of the Minister of Agriculture, who will be absent from the colony.

**Donations and Exchanges.**

The SECRETARY announced receipt of usual exchanges from various Agricultural Departments.

**Extracts and Translations.**

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

139. *Manuring of Flowering Bulbs.*—Many of the flowering bulbs, and especially hyacinths, are generally manured with rotten cowdung: but here such cowdung is mostly mixed with horsedung, which is deadly to them. I have now received answers from a number of persons in the trade abroad, or experimenting, who suggest the use of chemical manures, extracts from which follow below, viz.:—The chemical works of the late H. E. Albert, in London, recommend their flower manure to be used—one part in 1,000 parts of water—after the bulbs show above ground, every ten to fourteen days. Mr. Droog, of the society for the cultivation of bulbs in Holland, states that hyacinths require 300lbs. of nitrogen, 200lbs. of phosphoric acid, 25lbs. of potash, and 64lbs. of lime per acre, and prefers Thomas phosphate to superphosphate on account of its contents of lime. The soil for hyacinths near Haarlem is a sour moor mixed with the sand from the dunes. Too much nitrogen in the cowdung, formerly used up to 200,000lbs. per acre, caused the bulbs to split, and other fertilisers enable the cultivator to regulate this to a nicety. Professor Stutzer, of the Experimental Station at Bonn, uses to great advantage a mixture by weight of two parts of Thomas phosphate and one part of ground oilcake [for which latter you might substitute one part of woodluff, which contains the same quantity of nitrogen, or nearly one-third part of dried blood, or one-fourth part of nitrate of soda.—*CH. AGL. B.*] If mixed with about an equal quantity of sifted soil, you may put some of it upon the pots in which bulbs are growing, but do not mix it with the soil in the pot. Professor Dr. Paul Wagner recommends four parts superphosphate, four parts of sulphate of ammonia, one-half part of nitrate of soda, and one and a half parts of potassium nitrate, of which mixture you may use 3lbs. per 100 square metres two or three times during the growth of the bulbs, and water the ground thoroughly at once. This is like 1oz. per square metre (10½ sq. ft.). Mr. G. H. van Waveren, jun., of Haarlem, has made experiments with fertilisers for hyacinths in 1895-6, and found in each case an advantage over cowdung.

He used on one plot 350kg. of hornmeal, 350kg. of kainit, 350kg. of sulphate of ammonia, and 1,000kg. of lime per hectare (two and a half acres), and on another hectare 600kg. Thomas phosphate, 450kg. kainit, 350kg. of sulphate of ammonia, and 2,000kg. of lime. The latter produced the best flowers and bulbs. (One kilogramme about 2lbs.) Probsting and Chr. Arnold, of Brussels, recommend kainit against insects and diseases in bulbs, and with it superphosphate and crowding.

140. *Square-headed Wheats*.—The German Landwirtschafts' Society resolved in the year 1891 to make experiments for three years with varieties of these wheats reared by several growers. There were eight competitors, who had to deliver their wheat to those who were to carry on the experiments, of which there were twenty-seven in 1892-3, twenty in 1893-4, and twenty-one in 1894-5. The result has been that the variety of square-headed wheat raised by Mr. Motte in Quedlinburg was first, and that by Mr. Bredt, of Carlsburg, second as regards the quantity of grain harvested and the sum realised for the crops. Both wheats had a stiff haulm and less straw than others, and this showed again how valuable the theory of the late Professor Dr. Liebscher, of Göttingen is also in practice—that the smallest number of knots in the straw produces the largest crop if the stooling is about equal. It was found that of 100 haulms of Bredt's variety there were thirty which had only four knots, and only one with six knots, while other varieties had as few as two and four haulms with four knots, and twenty-seven and twenty-three with six knots. No notice had been taken of this matter by the persons who had experimented with Mr. Motte's variety of wheat. The clubby form of the ears, which was most pronounced in Motte's variety, is the best for grain, and it should therefore be the task of the breeders to raise a wheat with a stiff haulm and few knots and a clubby ear. Although the soil for the experiments was suitable for wheat, it should be mentioned that the seasons were not at all alike.

141. *Fruit Sent from Germany to Australia and Returned to Germany*.—The German Landwirtschafts' Society forwarded different kinds of apples from Hamburg as an experiment. Most of them, although wrapped in paper and wool made of wood, were bad when returned. Of the Reinette of Champagne, however, fully 60 per cent. arrived in a very fair state. The same sorts of apples were for the same term in a cellar at Hamburg, and showed fresh and appetising. It is therefore to be ascribed chiefly to the rough handling of the boxes, which weighed 150lbs., and were far too heavy to handle gently.

142. *Silene diocharis*, a native of Austria and Hungary, is an annual, and here probably perennial plant. Dr. Dzierson recommends it as a good fodder for cattle and bees; in fact cattle prefer it to clover. [I am only afraid it may become a troublesome weed on arable land, like some others of this genus.—CH. AGT. B.] Mr. Friedrich Hack, of Erfurt, sells seed at 4s. a pound.

143. *Iris pabularia*, perhaps synonymous with *Iris ensata varchinensis*, is a fodder plant from Cashmir, where the summers are very hot. Mr. Ermsen, who was head gardener for the Maharajah of Cashmir, recommends the plant as suitable for the farmers of the south of Europe and Algiers. He says that you can mow them when 1ft. to 15in. high, and again a second time. With irrigation you might get perhaps three cuts. If you want the fodder dried—and in this state it is by no means tough—you allow the iris to grow to 2ft. or more. Seeds (which can be best obtained at Vilmorin Andrieux & Co, at 4, Quai de la Mégisserie, Paris, for about 6d a packet, or 9s. a pound) should be soaked before being sown in a prepared bed, and transplanted about 10in. apart in each direction, or 8,000 per acre. For the first year or two the plants grow slowly, and they were not fully developed in Algiers at the third year. At the irrigated lands near Berlin the seedlings were, however, 1ft. high before winter. Since that time the leaves had grown to 2ft. and even 3ft., and were very thick upon the ground when seen lately by Professor Dr. Wittmack. Cattle on these lands, accustomed to softer irrigated grasses, did not take to the iris; but cattle like the plant in Cashmir, and goats and sheep are very eager after it. The late Baron von Mueller says of the plant:—"Central Asia.—I rather extensively grown for fodder on account of its nutritive properties. It maintains its ground well when once established. Probably only adapted for exceptional localities." I should not be at all surprised to see this plant do remarkably well on settlements at the River Murray. The ruler of Cashmir has lately purchased large tracts of land to be used for the cultivation of this plant.

144. *The Invisible Life of Fungi on Cereals*.—Mr. Ericksson has published, through the French Academy of Sciences, in March last, his latest experiments. Taken from a field, he enclosed rooted plants of cereals much liable to *Puccinia glumorum* into long and wide glass tubes, and closed them up on both ends with cotton wool. The soil was sterilised previously from any germs (it is not stated how this could be done), and no spores could be received from the outward air. Yet after two months rust appeared. Ericksson made a search for germs in the plant itself, but was unsuccessful. In the peripheric texture of the shrivelled grains of such rusty cereals he found strong growths of the fungi and at

times quite a nest of winter spores, but he was unable to find any such growth of fungi in the embryo of the grain, whether yet dormant under the pericarp or already on the light and sprouting. Only four or eight weeks later, after germination, as soon as the first spots of rust became visible, could he detect some growths of this kind, and then only in the immediate neighborhood of the spots. Not being able to account for the appearance of the rust, which could not have been infected from outside, nor finding in the previous phases of development of the plants any central seat of infection, or any trace of the existence of a fungus, he used the strongest magnifying glasses of his microscope for quite young spots of rust on the leaves of cereals, and found in their chlorophyllum one or more peculiar corpuscles of a plasmatic nature, mixed up with other ingredients, in each cell, sometimes annexed to the walls of the cells, sometimes swimming free in the protoplasm, mostly oblong, and somewhat bent or branching. Some had perforated already the sides of the cells, and had sent a fungoid threads outwards, with a sucking trunk left within the cell. Away from the spots of rust these corpuscles were not discoverable. He comes to the decision that those plasmatic corpuscles which swim free in the cell are the original forms of these fungi, where they live in the protoplasm in symbiose with the host-plant, and only make an independent appearance as a fungoid growth under favorable climatic conditions.

### Value of Vine Cuttings.

Mr. SNOW said he would like to call attention to the manurial value of vine cuttings. In very many instances the cuttings were carted away from the vineyard, instead of being burnt there and the ashes used. The ashes of vine cuttings contained about 4 per cent. of potash, being more than in any other plant, and nearly double that of bean stalks, which comes next with 2 per cent. This fact also shows that the vine should receive plenty of potash in the manures applied. Potash was deficient in the manures generally used.

Mr. HARDY supported. He always burnt his cuttings, and found it a saving of labor, besides making use of the ashes.

Mr. KELLY said he had noticed that in Germany some years ago, in a severe season, vine cuttings were fed to horses and cattle. He tried them himself, cut up into pieces about 2in. long, and found his horse ate them readily.

The SECRETARY said chopped vine cuttings had been used this year for horses and cattle at Angaston with success.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Balaklava, Mr. John Vivian; Redhill, Mr. R. Siviour; Kanmantoo, Messrs. H. Werner and W. Lewis; Port Broughton, Mr. H. H. Whittle; Narridy, Mr. W. J. Martin.

### Reports by Branches.

The SECRETARY reported receipt since previous meeting of thirty-nine reports of Branch meetings.

MONDAY, AUGUST 16, 1897.

Present—Messrs. F. E. H. W. Krichauff (Chairman), Sir S. Davenport, Messrs. Samuel Goode, W. C. Grasby, R. Homburg, Thomas Hardy, H. Kelly, T. Price, T. B. Robson, W. F. Snow, Hon. A. W. Sandford, C. J. Valentine, and A. Molineux (Secretary).

### Membership.

The Minister of Agriculture wrote that he had appointed Messrs. J. Miller, M.P., T. Price, M.P., and T. B. Robson to be members of the Central Bureau.

Messrs. Price and Robson were welcomed by those present.

### Codlin Moth.

The Minister of Agriculture forwarded report of deputation of fruitgrowers which had waited upon him, asking for a relaxation of the codlin moth regulation.

The SECRETARY read letters from Messrs. J. Lang, G. Neilson (Victoria), L. O. Howard (Entomologist, United States Department of Agriculture), T. W. Kirk (New Zealand), and J. W. Allen (New South Wales), speaking of the efficacy of Paris green for the destruction of codlin moth caterpillars.

After considerable discussion the following resolutions were carried :—

1. That the Minister of Agriculture be asked to have samples of Paris green obtained from vendors in the city analysed, and that the names of persons selling Paris green up to standard strength be published in the *Journal of Agriculture and Industry*, for the information of fruitgrowers.

2. That the Bureau recommends that the codlin moth regulations be referred to a special committee, to be appointed for the purpose by the Minister of Agriculture.

3. That the Committee consist of four members of the Central Bureau, together with representatives from each of the following fruit districts, viz., The Hills east and south of Adelaide, Gumeracha, Angaston, Mount Gambier, Clare, and Watervale.

### Finance.

The Finance Committee reported expenditure for July for contingencies £36 0s. 5d.; accounts to the amount of £24 1s. 7d. were passed for payment.

### Field Trial at Bute.

Mr. Kelly reported having attended the field trial and show of horses held at Bute on August 11 in connection with the Northern Yorke's Peninsula Bureau Field Trial Society. The weather being fine there was a large attendance of farmers, many of whom came a long distance to see the trials. The ploughs and drilling machines were watched with the greatest of interest, especially the latter. Eight of four, five, and six furrow ploughs competed, and the work all round was first class in spite of the fact that the land was very full of roots and stones and rather too dry. The ploughmen in most cases were to be complimented on their skill. Four different makes of drill were shown at work, and these were very carefully examined by those present. In travelling about he noticed that, owing in a great measure to the lateness of the rain, many crops on the older farms were very backward and dirty. Fallowing is also very late.

### Sale of Fertilisers.

Mr. Sandford again called attention to the necessity for the Fertilisers Act being amended so as to cover guano. A guano to be worth using should contain about 15 per cent. of phosphoric acid, but he knew of stuff containing only 4 per cent. being sold to farmers. The buyers were sure to be disappointed with the results, and, not knowing it was due to the low quality of the manure, would condemn the whole thing. It should be made compulsory for every seller of fertilisers other than stable and barnyard manure to the value of £1 to give a guaranteed analysis with the invoice. Mr. Snow said the Imperial Act of 1894 should be passed here. This was complete in every direction. Mr. Sandford said many of the manures were sold here at too high a price as compared with the real value. That analyses were necessary he had only to refer to basic slag or Thomas phosphate. This was a by-product from the

steel works, and its value depended entirely upon the amount of phosphoric acid the iron contained; some was rich, while others were very poor. The demand for this fertiliser had led to all the available slag being treated, and some of it was absolutely useless. In England best English basic slag was valued at £2 5s. per ton, while Scottish was only worth £1 3s. The Thomas phosphate imported into South Australia was mostly guaranteed as to its constituents, but the price (£5 5s. per ton) was too high.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

145. *Potato Rot*, according to Professor Dr. Frank, of Berlin, is not in all cases *Pero-nospora* (more correctly *Phytophthora*) infestans. He states that, secondly, another fungus, *Rhizoctonia*; thirdly, *Bacteria*; fourthly, *Nematodes*, in the form of small eels causing rotteness. The last three must be destroyed in the soil, and also by using to the seed potatoes similar remedies as for cereals. Potatoes should not too often be planted on the same land. What is the cause of potatoes becoming blue or variegated has not yet been ascertained. Mr. W. Paulsen, who has during the last thirty-five years raised a large number of new potatoes from seed, shows, not only that older sorts are much more liable to attacks from *Phytophthora*, but they lose also gradually their power to produce good tubers. It is useless, he says, to attempt to stop their decline by selecting only the best crops for planting. He has done this with many sorts in the years from 1880 to 1884, inclusive, and again from 1893 to 1896, inclusive, on two and a half acres, and found no advantage from such selections. On the contrary, the same varieties of potatoes used in both cycles of years showed considerably poorer crops in the last cycle of years. To renew our potatoes from seed is therefore absolutely necessary. The figures he gives are most convincing. I should like to see this done in South Australia; but potatoes here do apparently not often set berries. Seeds that I brought from Germany in 1848, with a view of evading the then raging potato disease, when sown in Bugle Ranges gave a great variety of the average size of marbles in the first year, but none were eventually kept as much superior to those in the market.

146. *Desirable Cereals* for cultivation in Germany are thus mentioned by Professor Dr. Maercker, of Halle. Of all kinds of barley, if manured with 80lbs. to 100lbs. of phosphoric acid and 32lbs. to 40lbs. of nitrogen per hectare (two and a half acres), the Hanna barley produced the largest crop, and was of the best quality; but if some kainit were added to the other fertilisers the barley was of considerably higher value. Of seven sorts of wheat manured with 400lbs. of nitrate of soda and 80lbs. of phosphoric acid per hectare the Bordeaux wheat and Noes wheat were found to be the best when tried in two different kinds of soil. Of nine kinds of oats Strube's oat was the best, if manured with 400lbs. of nitrate of soda. Of twelve kinds of potatoes the Professor Maercker gave a crop of 61,334lbs. against *Magnum Bonum* with 27,104lbs., and 19 per cent. of starch against 15·8 per cent. Of seventeen kinds tried at the German station for experiments with potatoes, Professor Maercker gave 248cwts. of 17·7 per cent. starch per hectare, while two others, Silesia and Hero, raised from seed by Mr. Cimbal, of Fromsdorf, in Silesia, were found superior as regards starch, viz., 19·1 and 19·7 per cent., and the crops of Silesia of 259cwts., and of Hero of 241cwts., was much superior to all others. Of six kinds of turnips the Red Eckendorfer gave 198,040lbs. of turnips per hectare, with a remarkably small quantity of leaves, and much in advance of the others.

147. *Carrots as a Fodder* can only be planted to advantage in our cooler, elevated, and humid soils or in the South-East. The white green-topped Giant, the orange-yellow green-topped Giant, the thick yellow of Saalfeld, the thick half-long Carotte des Vosges, and the red Altringham are the varieties recommended in a paper by Otto Münzer. The soil must be deep and loose, without stones. After ploughing to a depth of 6in. a subsoil plough ought to loosen the soil 6in. more. A sandy loam is particularly suitable, but a cold, wet subsoil is against a good growth. Some lime is of great advantage provided the soil is in good heart, being manured with cowdung or blood manure some months before, or with a nitrogenous fertiliser, as say two parts of nitrate of soda and three parts phosphoric acid in superphosphate, which Mr. Münzer thinks preferable to Thomas phosphate. In all cases the manures should be well mixed with the soil, so as to prevent the forking of the carrots in search of the manure. I prefer to sow carrots only on soil that has been heavily manured to a previous crop, and not specially for the carrot crop. It will also not be advisable to give a top-dressing of nitrate of soda shortly before the germinating of the seed, as it might make too hard a crust; if at all it should be done

later on. Potash salts should not be used for carrots except as applied to a previous crop. Elsewhere I find that you may use, but certainly not apply at the same time, per acre 400lbs. of Thomas phosphate, 400lbs. of kainit, 200lbs. of nitrate of soda or 150lbs. of sulphate of ammonia. Others recommend 90lbs. of Thomas phosphate, 90lbs. of nitrate of soda, and 180lbs. of kainit. Time and mode of sowing the seed, as mentioned by Mr. Münzer, is of course unsuitable for us, and I follow my own experience as to carrots in the garden. I should destroy all weeds soon after the soil received the first heavy fall of rain in March or April. The seeds require for their germination somewhat warm weather, that is from 15° to 16° C.; and of still more importance is the moisture of the soil, equal to 12 per cent. It is advisable to mix the seed twelve to twenty-four hours before sowing with sand, which must then be wetted. Although many sow their carrots broadcast this mode can only be defended where the ground is exceptionally clear of weeds. I advocate sowing in rows 10in. to 12in. apart if the hand hoe is to be used for the destruction of weeds, or fully 18in. if by the horse hoe. For smaller pieces of land a rake is the best tool for putting in the seed. The rows are made with the handle, and after sowing the rake can be used for prossing the seed down with a very thin covering of soil, or using washed out sea sand. Mr. Münzer mentions as very good to go with a wheelbarrow over the rows, and thus to press the seeds down. If you will drill in the seed you can neither mix with sand nor wet the seed. Five-eighths of an inch is the deepest you may cover the seed. Six and a half pounds of seed per acre would be required for broadcasting; 1½lb. to 3lbs. for sowing in rows, according to the intended hoeing. Clearing of weeds is very important; but the removal of all carrot plants to a width of 6in. or 8in. is certainly not required, 3in. being a sufficient distance. A not unusual way of thinning them is to do so only after those standing too near each other have attained sufficient size to be of use. The remaining carrots will scarcely have suffered from the proximity of those removed at such an early time. An acre of carrots is expected generally to yield better than one of potatoes, although the latter contain in equal weight more nourishment than carrots. A horse may receive 50lbs. of carrots with 10lbs. of hay; but a mare if in foal should receive very much less to avoid miscarriage. All other animals thrive upon carrots mixed with other food, but the quality of the milk from cows is not so good, nor the taste and smell of the butter. Carrots left for seed should be about 2ft. apart and the seed gathered at different times, as it ripens irregularly. In Europe the carrots intended to be used for seed are taken out of the ground and kept in sand until replanted. Whether we should transplant our carrots also, although our climate does not require us to do so, should be ascertained by experiment. In Europe the general opinion is that the seed does not come true unless the carrot has been transplanted. So far as my own experience goes, I have found the seed true from carrots left where they were sown.

148. *Growths of Cereals in Russia.*—During the last ten years on an average 161,660,000 acres have been cultivated in Russia, of which 60,672,000 were under rye, with an average crop of about 10cwt. per acre. Wheat was grown on 26,802,000 acres, and an average of 152,957,000 centals harvested; oats on 32,305,000 acres, with an average of 178,400,000 centals.

*Experiments with Wheat* made by Mr. Grenfell, of the Templeton School, are interesting. One was with three lots of African Baart wheat, sown all on the 12th day of June, but at different depths. Where the grain was sown 6in. deep only 50 per cent. grew, the tillering was very slight, the blades were long and thin, of a yellow and some of a rusty color; at 3in. depth 83 per cent. of the grain grew, the tillering was a little better, with long thin yellow flags; at ½in. depth 97 per cent. grew, the tillering was good, the flags green and broad. The average yield per acre he calculated as 6½bush., 11½bush., and 14½bush. respectively. His experiments with plump and shrivelled grain showed that of shrivelled Steinwodel wheat only 58 per cent. germinated, but there was little difference in the crop from shrivelled and plump wheat. Four shrivelled samples of Purple Straw, however, were very inferior. They gave only from 1.36bush. to 10bush. 17lbs. against 37bush. 11lbs. per acre from large plump wheat. Experiments with pickled and non-pickled wheat sown on 8th July, 1896, gave the following results:—

Leak's Rust-proof variety—Clean seed, sown dry; 80 per cent. of germination; no bunt.

Leak's Rust-proof variety (same sample)—Treated with bunt spores, and strongly pickled twelve hours before sowing; 51 per cent. of germination; no bunt.

Purple Straw—Sown dry; 92 per cent. of germination; 64 per cent. of bunt.

Purple Straw—Treated with bunt, and pickled five minutes before sowing; 65 per cent. of germination; no bunt.

Purple Straw—Bunted seed, put in hot water twelve hours before sowing; 89 per cent. of germination; 80 per cent. of bunt.

In all cases Mr. Grenfell has used a few hundred grains for his experiments. The wheat was not thrashed; it was beaten out in a bag.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Crystal Brook, Mr. E. Pope; Pine Forest, Messrs. G. Zilm and J. Flowers; Clinton Centre, Mr. G. Inkster; Paskeville, Mr. A. C. Wehr; Mount Bryan East, Mr. W. H. Quinn.

### Reports of Meetings.

The Secretary reported receipt of twenty reports of Branch meetings.

## REPORTS OF BRANCHES.

### Lucindale, July 17.

Present—Messrs. E. Feuerheerdt (Chairman), A. Matheson, S. Tavender, H. Langberg, J. Nilan, G. C. Newman, E. E. Dutton, A. Dow, G. Dow, and O. A. Witt (Hon. Sec.).

**FRUIT PESTS.**—Circular from Tanunda Branch *re* amendment of Vine, Fruit, and Vegetable Protection Act, was discussed at length, and it was finally decided to reply that this Branch is in favor of compulsory measures being taken in regard to protection of vine and fruit-growing districts, but that these measures should not be enforced in districts not interested. It was decided to nominate Messrs. H. Langberg and O. A. Witt for appointment as inspectors under the Act, in order to prevent the introduction of codlin moth infected apples into the district.

**ORCHARD WORK**—Mr. Tavender wished to know the cause of so many leaves falling from the orange trees this season, also whether it was advisable to cover rhubarb crowns during the winter to keep off frost. Mr. Newman said the frost took off a lot of the orange leaves. [In all probability this is a result of the past dry weather. It often happens that orange trees which have not been kept sufficiently watered lose a large number of leaves after a good watering. Frost will also cause the leaves to fall.—GEN. SEC.] The Chairman suggested that the rhubarb should be covered with manure, and a small case with a hole in the top placed over the plants. Mr. Newman asked whether it was advisable to spread artificial manures in the orchard in spring, before ploughing. He used superphosphate, and thought it best to plough it under. The Chairman said if a soluble manure were used he would fork it in round the trees.

**RAINFALL.**—For June, 2.790in.

### Arthurton, July 14.

Present—Messrs. W. Short (Chairman), M. Lomman, J. Koch, W. Smith, H. Freeman, W. H. Hawke, J. B. Rowe, and W. E. Hawke (Hon. Sec.).

**HOMESTEAD MEETING.**—This meeting was held at the residence of Messrs. Lomman and Freeman, the members being shown round the farm by the owners. The portion of greatest interest was the experimental plot, where the effects of various manures are being tried side by side. The plots have all been drilled in, and already the crops put in with the drill, with manure, show much in advance of those broadcasted.

**OFFICERS.**—Mr. W. E. Hawke tendered his resignation as Hon. Sec. and as a member, as he was leaving the district. He was accorded a vote of thanks for his past services, and Mr. J. B. Rowe was elected as Hon. Sec. in his place. Mr. W. Short was re-elected Chairman.



**JUDGING STOCK AND IMPLEMENTS.**—Members unanimously favored the scheme of judging stock and implements as outlined by Mr. J. St. J. Mudge on pages 314 and 315 of the May issue of the *Journal*.

**RAINFALL.**—Recorded at Winulta, for six months ending June 30, 5·710in ; at Tiparra, 5·214in. ; for July, to date, 1·060in. and 1·180in. respectively.

### Hahndorf July 31.

**Present**—Messrs. A. von Doussa (Chairman), M. C. Bom, F. Sonnemann, C. Jaensch, T. Grivell, H. Spoehr, H. Kerr, G. Sandow, J. C. Rundle, A. L. Paech, and D. J. Byard (Hon. Sec.).

**MOLASSES FOR STOCK.**—Mr. Sonnemann reported having used molasses, mixed with chaff and bran, for horse feed, with success.

**CONGRESS.**—Members expressed a desire to have the whole question of measures to be adopted for the eradication of the codlin moth pest discussed at the forthcoming Congress of the Bureau, on September 8 and 9. It was also stated that the efforts of the Bureau to secure the adoption of standard names for export apples met with the support of many fruitgrowers in this district.

### Port Elliot, July 24.

**Present**—Messrs. C. H. Hussey (Chairman), H. Green, E. Wood, J. Virgin, P. O. Hutchinson, F. T. Fischer, E. W. Hargraves, J. Brown, O. J. Whitmore, and E. Hill (Hon. Sec.).

**FERTILISERS ACT.**—Resolved that Central Bureau be requested to use its utmost influence to secure enforcement of the provision of the Fertilisers Act requiring that all fertilisers, except stable and barnyard manures, when sold, shall be accompanied with a certificate of analysis.

**VINE, FRUIT, AND VEGETABLE PROTECTION ACT.**—Messrs. J. Brown, P. O. Hutchinson, H. Green, F. J. Fischer, and E. W. Hargraves were appointed as a committee to consider proposals by Tanunda Branch for amendment of this Act.

**TO PRESERVE WIRE FENCING, &c.**—Mr. J. Brown, in reply to inquiry by Mr. Roberts, of Calca, recommends that in salt country the wire should be painted with gas tar ; but it is always better to use galvanized wire.

**INTERCOLONIAL FRUITGROWERS' CONFERENCE.**—Mr. P. O. Hutchinson reported upon his visit as a delegate to the Intercolonial Fruitgrowers' Conference in Queensland, and expressed appreciation of the courteous treatment accorded to the delegates in each of the colonies through which they passed.

**PLANTING POTATO SETTS.**—Mr. Brown said : " I have tried planting potato sets with the eyes down, as recommended in some agricultural papers, but do not agree with the recommendation. Potatoes always do best with me when the sets are planted with the eyes up. This was the practice in Scotland thirty years ago. My opinion is, if planted eyes down, the sets become rotten and do not come up at all, or, if they do, the plant is very much weaker."

### Finniss, August 3.

**Present**—Messrs. A. Willcock (Chairman), T. K. Sumner, S. Eagle, S. Collett, W. W. Heath, H. Langrehr, R. J. Ness, and T. Collett (Hon. Sec.).

**MANURES.**—Chairman reported that a cereal crop sown by himself along with Adelaide Chemical Works' superphosphate, was doing well, whilst

another plot, sown with German phosphate, was not thriving. Mr. S. Collett has a crop of Dart's Imperial wheat, manured with bonedust, which has already reached 15in. high, and must be cut back, as it is growing too rankly.

**FODDER FOR STOCK.**—Maize and lucern are chiefly grown on damp soils, or where irrigation can be used. On the dry soils they grow Jersey tree kale and spurrey. Last season good results were obtained with Cow pea. Pie melons are useful for feeding cows. Mr. Collett has grown a little *Paspalum dilatatum*, which appears to withstand drought.

**DRILLING CEREALS WITH MANURES.**—Mr. E. R. Morgan has introduced the first seed drill into the district this year, and is drilling in his crops with it.

### Holder, July 30.

**Present**—Messrs. F. A. Grant (Chairman), H. Blizzard, H. Vaughan, E. Crocker, P. J. Broughan, F. Rogers, J. Mitty, J. O'Connell, F. Slater, J. J. Odgers (Hon. Sec.), and three visitors.

**SEASON.**—Rainfall recorded for July 0.485in. Members reported that the Broadleaf mustard was making splendid growth, also Algerian oats were doing well.

**FRUIT-GROWING.**—Mr. Vaughan answered a number of questions concerning fruit-growing in this district. He considered the climate too hot and dry for apples and plums, while the quince was not a good marketable fruit. Figs should not be watered too much, otherwise the trees make too much root growth and throw up many suckers. If the bark of fruit trees becomes "tight," as a result of a bad season, it should be slit upwards with a knife on the shady side.

**PIG-BREEDING.**—The paper read at Sixth Congress on pig-breeding and bacon-curing was read and discussed.

### Onetree Hill, August 6.

**Present**—Messrs. A. Adams, F. Barritt, H. H. Blackham, F. Bowman, G. Bowman, J. Flower, J. Hogarth, F. L. Ifould, W. Kelly, A. Kelly, A. Thomas, and J. Clucas (Hon. Sec.)

**POULTRY.**—Mr. F. Bowman gave an interesting address on this subject. He said he hoped to receive some information as well as to give them the benefit of his experience. This he considered to be one of the advantages accruing to membership of the Bureau. He proposed to deal with egg-producing, particularly in regard to winter supply. The Mediterranean breeds, Minorca, Spanish, Andalusian, and Leghorn were all good layers. It was claimed that heavy-combed birds, such as Minorcas, thrived better and were less liable to disease if the combs were clipped. Winter layers must be hatched in August. To secure a continued supply of eggs chickens should be raised right throughout the year. Sufficient food must be supplied, but it must be remembered that fatness was inimical to productiveness. Maize and oats were excellent for feeding purposes. Fowls do best round stacks where they have to find their own food. Shelter and warmth were necessary, and cleanliness must be secured. For this purpose iron roofing and movable perches were essential. The number of roosters in the yard is immaterial, as they are simply required to fertilise the eggs. After two years of age fowls were rarely profitable. Frequent introduction of new blood was necessary, and an occasional change of breed was advisable. The best results are obtained when warm food is given first thing in the morning, with some meat

added, and grain just before roosting time. Bonedust was recommended for growing fowls, and a sprinkling of lime about the yard was necessary. The Hamburg, if properly treated, was probably the most prolific fowl, and was also hardy, while the Spanish was rather delicate. A short discussion followed.

### Clinton Centre, August 6.

Present—Messrs. R. A. Montgomery (Chairman), T. Illman, G. Mason, J. Phelps, J. Burkin, H. Crowell, J. L. Broadbent (Hon. Sec.), and two visitors.

NAME OF BRANCH.—It was proposed to change the name to Dowlingville Branch.

HORSE COMPLAINTS.—Members stated that many horses in this district have died recently through being literally eaten away by very small intestinal worms. Several had cured horses attacked by giving a dessert-spoonful of sulphur in a pint of linseed oil twice a week.

### Kadina, August 2.

Present—Messrs. T. M. Rendell (in chair), S. Small, T. Jones, G. E. Putland, C. Whittle, W. Cowley, M. Quinn, P. Roach, D. Taylor, S. Edyvean (Hon. Sec.).

ROLLING AND HARROWING CROPS.—Mr. Small said, as they must do all they possibly could to ensure a crop, he would like the opinions of members as to whether rolling was beneficial, and, if so, when it should be done. He had found no benefit from it. Mr. Johnstone considered it beneficial. The land should be well broken up and then thoroughly harrowed previous to rolling. If the crop had to be cut for hay the advantage of rolling was plain. He recognised that there was a danger of rolling too soon and injuring the young plant. Mr. Quinn thought rolling desirable, especially with hay crops, but, as there was a great difference in soils, each man would have to exercise his judgment as to whether he should roll or not. Mr. Taylor said the owner of a farm in the south, which was known as "the model farm," always rolled his land and had good crops. Mr. Cowley thought the best time to roll was before sowing in order to make a good seed bed. For hay crops, he would roll after sowing. Mr. Putland questioned whether any advantage was gained by rolling. Land ploughed after rain gave a better return than that rolled, and he had heard many say rolling damaged the crop. He did not think this correct, but considered it would be of more use rolling before sowing. Mr. Roach said it depended on the soil and rainfall. If rain came soon after the land was rolled the result would be beneficial, but if dry weather set in it would be a failure. For hay it was necessary to roll in order to get a good clean cut. Mr. Edyvean's experience of rolling on loose soils was favorable. He had been accustomed to harrowing once or twice and then rolling. It was essential in a hay crop to have all the lumps broken, and this could only be done by rolling. The Chairman said he was inclined from the result of his observations to favor rolling. The question of harrowing the growing crop was also discussed, the general opinion being that, as far as the wheat crop was concerned it was not advantageous, the chief aim being to kill some of the plants where they are too thick. [The principal idea in harrowing a growing crop of wheat or other cereal is to loosen the surface to a fine tilth and admit air to the roots, which is necessary to promote the full and proper development of the plant.—GEN. SEC.]

**SMALL PADDOCKS.**—A discussion took place in reference to whether small paddocks were profitable. Members were of opinion that, for cropping, large paddocks were an advantage, as in ploughing and other work a lot of time was lost at the ends, while for depasturing purposes the smaller fields had a decided advantage, as sheep and cattle would put on more flesh and do better with frequent change.

**STRAYING STOCK.**—It was decided to ask the local council to call for applications from farmers willing to act as rangers in their immediate neighborhood in order to check the nuisance caused by horses and cattle straying on the roads.

**OFFICERS.**—Mr. T. M. Rendell was elected Chairman for ensuing year. Mr. Edyvean tendered his resignation as Hon. Sec. on account of press of other work.

### Pine Forest, July 20.

Present—Messrs. J. Phillis (Chairman), J. St. J. Mudge, A. Mudge, W. Burgess, J. J. Lewis, D. F. Kennedy, W. H. Jettner, F. Inglis, R. Barr, jun. (Hon. Sec.), and a number of visitors.

**FIELD TRIALS.**—Matters in connection with the forthcoming field trial of agricultural implements at Bute were dealt with.

**JUDGING STOCK AND IMPLEMENTS.**—Mr. Mudge referred to criticisms on his paper on this subject. The Kadina members had evidently not understood his scheme. Judging horses by points as advocated by him had not been tried in this district. They would see from his specimen judge's card that each judge had to determine the relative qualities of the horses from his own idea of a model horse and not from a set of printed points, and each might arrive at his decision on an entirely different basis.

**RAINFALL.**—Recorded at Bute for first six months of each of the following years:—1891, 2·150in.; 1892, 3·500in.; 1893, 12·310in.; 1894, 6·620in.; 1895, 7·600in.; 1896, 10·400in.; 1897, 4·470in.

**HINTS FOR SMALL HOLDERS.**—Mr. Kennedy called attention to paper read by the Hon. Sec. Port Lincoln Branch on this subject; he considered it one of the most practical ever printed in the *Bureau Journal*. It was decided to discuss the paper at next meeting.

**VISIT TO HOMESTEAD.**—This meeting was held at the residence of Mr. Barr, a number of visitors being also present. The garden, orchard, farm buildings, &c., were inspected and favorably criticised.

### Bowhill, July 17.

Present—Messrs. W. G. F. Plummer (Chairman), J. G. Whitfield, W. Tyler, J. McGlashan, J. Waters, C. Drogemuller, A. Dohnt, J. D. Cockshell, J. Towill, J. Whitehead, J. Gregory, W. Sears, H. H. Plummer (Hon. Sec.), and three visitors.

**BEST WHEAT FOR DISTRICT.**—Members were unanimously of opinion that the Early Frampton was the most suitable variety of wheat for this district, being a quick grower and good stooler.

**PAPER.**—Mr. Gregory read paper prepared by Mr. J. Pontt, of Gumeracha Branch, on "How to make Farm Life Attractive," with which members generally agreed.

**WORK FOR MONTH.**—Bush cutting, scrub carting, and fallowing were considered operations suitable for August. Early tomatoes, cucumbers, and melons should be sown, and onions and other vegetables transplanted.

### Lyrup, August 3.

Present—Messrs. A. Pomeroy (Chairman), D. J. Bennett, E. J. Dwyer, F. E. Chick, R. S. Cheek, T. Nolan, A. Thornett, T. R. Brown, W. H. Walling, D. Thayne, W. H. Wilson (Hon. Sec.), and one visitor.

**SEED EXPERIMENTS.**—Mr. Walling tabled splendid sample of Burpee's Allhead cabbage grown from Bureau seed. It was very firm and crisp, weighed 10lbs.; it was irrigated during growth. Mr. Pomeroy reported that Danish Island oats were growing very vigorously and were 2ft. in height.

**ALKALI SOILS.**—The Hon. Secretary read a paper on "Alkali Soils and their Treatment with Gypsum," prepared by Mr. F. Krichauff, and a good discussion followed.

### Gladstone, August 7.

Present—Messrs. J. Tonkin (Chairman), Joseph King, J. Shephard, J. Gallasch, B. Griffiths, T. Hortin, E. Coc, and J. Milne (Hon. Sec.).

**FIELD TRIAL.**—The Chairman and Hon. Sec. were appointed to attend meeting at Crystal Brook for the purpose of forming a society to hold field trials of agricultural implements.

**ANNUAL REPORT.**—The Hon. Secretary reported that during the year six meetings were held, with an average attendance of nine members. Several meetings fell through for want of a quorum. He regretted the apathy shown by many of the members, and unless they took more interest in their work the Branch would soon cease to exist. Messrs. J. Tonkin, J. King, and J. Milne were re-elected Chairman, Vice-chairman, and Hon. Sec. respectively for ensuing year.

### Willunga, August 7.

Present—Captain Atkinson (Chairman), Dr. Counter, Messrs. John Allen, J. A. Jacobs, A. Slade, W. J. Binney, and C. Brey (Hon. Sec.).

**ABNORMAL GROWTH.**—Mr. Jacobs tabled sample of apples, being the second crop during the season. He wished to know the cause of this. [This unseasonable fruiting is not rare. It is probably due to the tree having received a check from some cause, followed by a fall of rain and warm weather.—GEN. SEC.]

**FRUIT-GROWING.**—Mr. Jacobs read a paper on "Fruit Trees and their Culture," which was well discussed. He stated that he had picked three dozen lemons from his trees, which together weighed over 11lbs.

**SEED EXPERIMENTS.**—Mr. Binney stated that his experimental plots, over 100 in all, were looking very well, the wheat being over a foot high.

### Mount Bryan East, August 7.

Present—Messrs. H. W. Collins (Chairman), H. Collins, James Prior, E. T. Prior, T. Wilks, J. Doyle, R. Webber, W. Bryce, A. F. W. Polner, T. Best, and three visitors.

**FODDERS FOR STOCK.**—Mr. Wilkins said he found about 1½lbs. of Copra cake mixed with a small quantity of chaff sufficient for a feed for two horses. He had also found gum leaves to be good feed for cattle during the past season. The members were unanimously of opinion that the best indigenous tree for feed for stock was the sheoak (*Casuarina quadrivalvis*), the sandalwood (*Santalum* sp.) being considered next in value. The former has been used to

a very large extent during the past season for horses and cattle, and the latter for cattle and sheep. It is found, however, that the sandalwood does not do for long without the addition of some other bush or grass. Mr. Best tabled branch of *Cytisus proliferous* (tree lucern), which did very well with him, and was very greedily eaten by his cattle, even branches half an inch thick being eaten. He had also had satisfactory results from Jersey and Palm Tree kale. The Chairman thought more use might be made of lucern. He had a small plot, planted sixteen years ago, which is still in a prosperous condition, and from which he got a good cutting this year. It did not pay to feed the lucern down close. He had found the Cow pea (*Dolichos sinensis*) do well with him, and believed it would prove a good fodder in some parts of the district. From one plant, which was over 6ft. in length, he gathered 143 pods, which averaged nine seeds each. He thought the seed should be sown at least 3ft. apart, and intended sowing a plot this season. Broadleaf mustard had proved a splendid doer with him, and this year he had got good feed from it. He considered it would pay farmers to grow this. If sown in March it would start with the first showers, and give good feed when most required.

### Auburn, August 12.

Present—Messrs. S. M. Dudley (Chairman), E. W. Castine, S. Ford, J. Hean, W. R. Klan, Dr. J. W. Yeatman (Hon. Sec.).

**HARROWING GROWING CROPS.**—Mr. Klan advocated harrowing and subsequent rolling of the wheat crops to loosen and aerate the top soil, and to give the plant a fresh start. He had harrowed crops 6in. in height, with marked benefit. He would not, however, advise harrowing a crop of Steinwedel wheat at this height.

**DRILLING SEED.**—Members were of opinion that the best depth to drill in seed with manure was 2in. They also recommended sowing *Holcus* in the fallows with the drill and manure for summer fodder. The rows should be sufficiently wide to admit of summer cultivation.

### Paskeville, August 7.

Present—Messrs. J. C. Price (Chairman), A. Goodall, A. Palm, J. Bussen-schutt, G. Meier, J. D. Reed, J. H. Nankervis (Hon. Sec.), and one visitor.

**FEED FOR STOCK.**—Mr. Goodall reported having used Copra cake with cocky chaff with very satisfactory results. He considered it cheaper and better than bran and pollard. Other members reported having kept their stock in fair condition on chaffed straw, with hay chaff and by itself. [About 1lb. of Copra cake twice a day with chaff or straw appears to be the usual quantity given.—GEN. SEC.]

### Mount Compass, August 10.

Present—Messrs. J. Youlton (Chairman), W. Gowling, R. Peters, A. Hancock, C. Hancock, F. Slater, E. Good, and one visitor.

**CONGRESS.**—It was decided that Mr. Gowling should arrange with Mr. D. Wright to prepare a paper for Congress on "Manuring of Vegetables."

**DAIRYING.**—Mr. Gowling read a short paper on the "Home Dairy." He considered one or two good cows would pay to keep on their blocks. No home was complete without its little home dairy. In this district warm shelter-sheds are absolutely necessary. The more kindly the cow is treated the better the

result. No dog should be used for driving cows. With a good cow properly attended to they could in this district average 10lbs. of butter per week for at least three months. The keeping of pigs to use up the refuse milk would also result in a considerable saving of household expenses. Then, too, the manure, if carefully saved, would prove of great value to them. They would have to grow feed for their stock, and for this purpose hay, with turnips and mangolds, were best for winter use, and maize, sorghum, and lucern for summer. Turnips should, however, not be given in large quantities, as they taint the milk. For quantity the Ayrshire will probably give the best yield, but for butter the Jersey and Alderney give the highest return for their feed.

**STOCK COMPLAINTS.**—Mr. Good reported that his horse was suffering from attacks of tick or lice. Mr. Slater stated that his cow had recovered from the eye disease previously reported. [How was she treated to effect this cure?—**GEN. SEC.**]

### Stansbury, August 7.

**Present**—Messrs. A. Anderson (Chairman), H. C. Pitt, C. Faulkner, P. Anderson, J. Sherriff, G. Jones, C. Hepenstall, J. Henderson, G. Brundell, G. Sherriff (Hon. Sec.), and two visitors.

**BRANCH CONFERENCE.**—It was decided to co-operate with Minlaton Branch in holding a conference of branches at Minlaton some time during September.

**FRUIT PEST LEGISLATION.**—Members were opposed to the new codlin moth regulation, which they considered too arbitrary and oppressive. They were also opposed to the Phylloxera Bill now before Parliament, clauses 26, 29, 31, 36, and 40 being especially objected to.

### Richman's Creek, August 9.

**Present**—Messrs. W. Freebairn (Chairman), A. Knauerhase, J. M. Kelly, J. J. Searle, J. Gebert, J. McSkimming, M. Hender, J. A. Knox, W. J. Wright, P. J. O'Donohue, and J. McColl (Hon. Sec.).

**FEED FOR STOCK.**—Mr. O'Donohue said he grew a few pie melons last year, and found them very useful for dairy cows. He would certainly recommend the growth on a larger scale in the North. Several members stated they had been compelled to pull all the old straw off their sheds to feed the stock. In some instances it was chaffed and mixed with pollard. Mr. Wright said he had heard of porcupine grass being boiled and mixed with bran for dairy cows, with satisfactory results. The Hon. Secretary mentioned that a number of cows had been kept alive on chaffed porcupine grass, which had previously been washed to clear off the soil, and mixed with pollard. Several members intimated their intention of putting in a quantity of sorghum for summer feed. Holcus was considered to be most prolific, but Early Amber Cane was better feed. It was decided to make inquiries as to cost of obtaining seed in bulk for members, also best varieties.

**OFFICERS.**—Messrs. W. Freebairn and J. McColl were re-elected Chairman and Hon. Sec. respectively for ensuing year; Mr. A. Knauerhase being elected Vice-chairman.

### Mount Remarkable, August 11.

**Present**—Messrs. A. Mitchell (Chairman), W. Girdham, A. Pope, W. Lange, G. Yates, and T. H. Casley (Hon. Sec.).

**PESTS.**—Members would like to have discussed by branches the questions of bird pests, and best means of exterminating "soursop," or oxalis, in the vine-

yard and on stony patches. This weed is becoming widely distributed in the district. [Frequent cultivation to destroy the foliage as soon as it appears will in time exterminate this weed. If the patches are fenced off and pigs turned in they will root up nearly every tuber and thrive on them.—GEN. SEC.]

**FEED FOR STOCK.**—Members reported having fed porcupine grass and hay straw to both horses and cattle in the absence of better food.

**HINTS FOR FARMERS.**—Mr. Jorgensen read a short paper on this subject. He said his experience since 1848 was that they generally had two or three good seasons followed by one bad one. Sometimes they had more good seasons, and unfortunately too often they two bad ones in succession. The lesson taught by the past year's experience was that unless they were to suffer from periodical losses of stock they must provide some food for seasons of scarcity. Even if not required at once, a supply of food was always valuable, and as there was never any certainty as to what the season was going to be, it was advisable to gather a stock of feed at the first possible opportunity. With most farmers cutting their crops with the binder and saving the straw was probably the most readily available means of doing this. The crop can be cut before dead ripe, and thrashed with a disc header. The straw will be nearly as valuable as hay, and there will be no depreciation in quality or quantity of the grain. The disc header will only cost £12 10s., and with care will last a lifetime. Members generally approved of Mr. Jorgensen's ideas, and thought that to farm successfully in this district it will be necessary to use the most up-to-date implements, especially the seed and manure drill, the binder, and disc header.

### **Port Pirie, August 10.**

Present—Messrs. E. J. Hector (Chairman), H. B. Welsh, E. Stephens, T. Gambrell, G. M. Wright, R. F. Humphris, and R. M. Bertram (Hon. Sec.).

**BUSINESS**—Delegates were appointed to attend meeting at Crystal Brook Bureau to consider the question of holding field trials of agricultural implements, and other formal business transacted.

### **Meadows, August 3.**

Present—Messrs. J. Catt (Chairman), T. B. Brooks, G. Ellis, W. J. Stone, G. Rice, G. Usher, D. Tester, T. A. Buttery, H. V. Wade, T. Usher, W. Collins, W. Nicholle, and W. A. Sunman (Hon. Sec.).

**MANURES.**—It was decided to ask the Central Bureau whether they could publish a small handbook on "Chemical Manures, and How to Use them."

**PRUNING OF FRUIT TREES.**—Mr. Catt initiated a discussion on this subject, and to those who were unable to attend demonstrations given by Mr. Quinn he explained the methods of pruning advocated by that gentleman.

### **Petersburg, August 7.**

Present—Messrs. W. Miller (Chairman), H. Earle, W. Waters, R. Cochrane, A. Dowd, F. W. Sambell, D. O'Leary, James Wilson (Hon. Sec.), and one visitor.

**BEZOAIRS IN HORSE.**—Mr. Cochrane tabled a mass about the size of a cricket ball taken from the stomach of a dead horse, also portions of shrubs upon which the animal had been grazing. Members thought the shrub known locally as native cherry was responsible for these accumulations. [These balls



are known as bezoars, and are not uncommon during seasons of scarcity. The horses feed upon bushes and shrubs to a very large extent, and the undigested fibrous matter accumulates in the stomach and becomes felted into balls, finally killing the animal. The native cherry in itself is not injurious, the absence of green succulent feed being the real cause. Before the matter forms into balls purgatives would probably remove it, but later on nothing can be done.—GEN. SEC.]

**FEED FOR STOCK.**—Mr. Cochrane reported having used potatoes boiled and mixed with chaff for horses and cows. About 2cwt. of potatoes per day with the chaff kept four cows and seven horses alive. The potatoes cost £2 17s. per ton at Petersburg, and at this price there was a saving as compared with chaff; but unfortunately for him the price went up, and he was unable to continue using them. Mr. Waters boiled 4lbs. of linseed, and mixed it with two bags of chaffed straw. This made a day's feed for eight horses, at a cost of about 6d. per horse per day. The more the straw was broken up the better it seemed; straw damped and chaffed griped the horses badly. The Chairman had kept his animals alive on sheoak. With the larger trees he lopped off the branches, but with young trees they had to cut them. The horses did well on this, but unfortunately he allowed them to get too low in condition before he started with it. Milk cows also did well on sheoak tops. He had known of several settlers who had kept their cows alive on chaffed porcupine grass, also on boiled aloe leaves with the thorns cut off. As the cows were very fond of this, and did well on it, they might pay more attention to the plant, as it grows vigorously anywhere in the district. The old straw from sheds and stables had had to be used by many farmers to keep their animals alive, but the losses had been heavy, and it will take the natural increase of two or three years to replace them.

**DESTROYING SPARROWS.**—Mr. P. Browne, of Nackara, wrote that he had been successful in destroying sparrows with poisoned wheat by placing a few grains on the tops of all posts, &c., round the premises. The wheat keeps good for a long time, and nothing else will take it.

### Forest Range, August 12.

#### INAUGURAL MEETING.

Present—Messrs. J. Vicars, G. Monks, H. Caldicott, J. Fry, A. Green, J. Green, R. Townsend, J. Sharpe, J. G. Rogers, C. Stafford, and R. M. Hackett.

**BUSINESS.**—Messrs. J. Vicars, J. Green, and R. M. Hackett were elected Chairman, Vice-chairman, and Hon. Sec. respectively for ensuing year. Rules for conduct of business and other formal matters were dealt with.

### Mylor, August 7.

Present—Messrs. W. H. Hughes (Chairman), S. Roebuck, F. Wilson, P. Probert, W. B. Lund, A. Hampton, W. Nicholl, T. Mundy, R. Mundy, E. T. Oinn, W. T. Elliott, S. Pearce, W. G. Clough (Hon. Sec.), and fifteen visitors.

**FEED FOR STOCK.**—The Chairman reported having used copra cake for feed for pigs. It gave better results than pollard, and he was of opinion was a little cheaper to use.

**EXPERIMENTS WITH SEEDS.**—Samples of Iceberg Lettuce and Chicory grown from Bureau seed were taken, but were of indifferent quality.

**MANURING.**—Mr. Roebuck manured about twelve rods of barley with  $\frac{1}{2}$ cwt. Thomas phosphate and  $\frac{1}{2}$ cwt. of kainit, and a similar area with same quantities

of bonedust and kainit, with the result he got twice as much from the latter plot as from the former. Mr. Oinn reported having manured one plot of oats with bonedust and another with Thomas phosphate. The former was far ahead of the latter.

**WORK FOR MONTH.**—Plant potatoes, sow peas, turnips, cabbage, and other vegetables; also kidney beans and tomatoes at end of month.

### Davenport, August 6.

**Present**—Messrs. F. Rathbone (Chairman), R. Fawcett, G. W. Johnstone, W. Hodshon, J. Holdsworth, and H. Brown (Hon. Sec.), and eight visitors.

**DAIRY BULL.**—A committee was appointed to consider and report upon the question of procuring a pure-bred dairy bull.

**EXHIBITS.**—By Mr. Holdsworth, fine lemons and very good cut roses; by Hon. Secretary, All-head cabbages from seeds introduced by Central Bureau; by Mr. R. Fawcett, samples of shredded bone for fowls, made by himself by aid of a bonemill recently purchased.

**"HOW TO UTILISE OUR ADVANTAGES."**—This was the title of a paper read by Mr. Holdsworth. The following is an abstract:—

All our advantages of soil, location, and early seasons are useless without a generous supply of water. Given this necessary, how can blockers, farmers, and fruitgrowers use the land to make it profitable in every way? For vegetables, fruit, &c., there is required a sure and continuous market and a regular continuous production, and the produce should reach its destination in the cheapest possible way consistent with undamaged condition. If distributed locally, it should be without intervention by the middleman. To ensure these conditions each blocker should undertake to provide a certain quantity of produce, and the blockers should co-operate and select one of their number to act for them and distribute the produce. It would be advantageous if a market were established in or near the Port, where a market could be held once or twice a week. Any surplus could at once be transmitted to other towns or Broken Hill. The northern towns are not well supplied, and Port Augusta receives food supplies and cereals from Adelaide. There is a large field locally and in surrounding centres that should be taken up by farmers and gardeners of this district. The middlemen obtain their supplies from Adelaide at high rates, and those often arrive in bad condition; but if the local growers were to combine and agree to produce continuously and abundantly, the middlemen would find it to be advantageous to purchase from them. The Chinese gardeners can always maintain a supply, and customers can depend upon them; surely the blockers could co-operate and do equally well, if not better. They should continuously work their land, instead of intermittently, as at present, especially when the water supply is ensured. Farmers also would dispose of much of their produce at the market if it were established; local produce would not be subject to the double freight, commission, &c., that were incurred on produce brought from Adelaide. Then there was dairying. If each blocker would maintain four cows in full milk there would be about thirty cows. The owners could combine and run a creamery, and send the cream to Broken Hill, or make butter and sell it locally. The skim-milk and waste from the gardens could be used to feed pigs, fowls, &c. In time other industries would be developed in connection with those mentioned, and thus the sources of employment would be increased.

In discussion, some members thought the blockers and other local growers too heavily handicapped by Chinese and the Adelaide growers to allow of successful competition.

### Kanmantoo, August 13.

**Present**—Messrs. T. Hair (Chairman), E. Downing, P. Lewis, A. Hair, and W. G. Mills (Hon. Sec.).

**FODDER FOR STOCK.**—The Hon. Secretary said he was trying tree lucern (*Cytisus proliferus*) on sandy country, and he believed it would do well. The plants had come up well, and are growing nicely. He thought the plants would prove of great value in dry seasons.

**FALLOWING AND SUMMER CROPS.**—The Chairman said he had sown fallowed land and freshly-ploughed land alongside at the same time, and some seasons got the better crop from the fallowed, and at others from the freshly-ploughed land. Unless it was due to the seasons he could not account for the variable results. The Hon. Secretary advocated ploughing in September and October, and growing summer fodder crops. By this means the land could be cleaned, and a good herd of cows, which would be as profitable as any crop, kept. Where artificial manures are to be used this would prove the best time to apply them.

### Stockport, August 17.

**Present**—Messrs. T. Watts (Chairman), C. W. Smith, J. Smith, J. Smith, jun., D. G. Stribling, T. Howard, T. Megaw, G. Burdon, J. Murray (Hon. Sec.), and four visitors

**FEED FOR STOCK.**—Mr. C. W. Smith said he found cattle, horses, pigs, and sheep eat the artichoke (*Cynara scolymus*) readily, and poultry were fond of the seeds. He thought it would pay to grow for sheep. Prickly pear and American aloes, with the prickles scorched off and passed through the chaff-cutter, had been used this season; also a mixture of copra cake and wheat chaff, on which cows and young horses did well.

### Naracoorte, August 14.

**Present**—Messrs. O. Hunt (Chairman), D. McInnes, H. Buck, J. Wynes, R. U. Paris (Hon. Sec.), and one visitor.

**MANURES.**—Mr. Wynes thought bonedust from chemical works did not have the effect it should owing to the oil being extracted in the manufacture. [The value of bonedust or any other manure depends on its constituents, and the analysis which the buyer is entitled to demand from the seller will show at once whether there is anything wanting. It is distinctly advantageous to have the grease extracted.—GEN. SEC.] The Chairman said Mr. Lobban, of Lucindale, told him he found that he got better results from 1cwt. of bonedust sown wet with the seed than from 2cwts. sown dry. Mr. Buck said he noticed that at one of the Bureau meetings a member had stated that where guano had been put in with the potatoes when planting the results were bad. His experience was quite to the contrary.

### Johnsburg, August 7.

**Present**—Messrs. F. W. Hombsch (Chairman), T. Potter, L. Chalmers, M. L. Read, T. Thomas, J. Sparks, H. Napper, T. A. Thomas, P. Caughlan, W. McRitchie, T. Johnson (Hon. Sec.), and one visitor.

**FEED FOR STOCK.**—Members generally found a mixture of linseed and chaffed hay very useful, stock doing well on it. Where a little hay chaff was added the animals kept remarkably healthy. The Chairman said his horses had been running in the hills and feeding principally upon spinifex or kangaroo grass, which, although coarse, was of great value in such dry seasons. It had grown very rapidly since the rain. [The plants generally known as spinifex (*Triodia irritans*) and kangaroo grass (*Anthistiria ciliata*) are quite distinct, and the latter is regarded as a valuable grass at all times.—GEN. SEC.] Two members reported using chaffed barley straw, with bran and boiled wheat added, but the animals scoured badly. Numbers of cattle had been kept alive on the

leaves of the sandalwood trees. Several members spoke of the foolish practice of some settlers who cut the trees down, destroying them entirely, whereas if they are simply topped or pruned the trees remain and send out a strong growth of new foliage. There are a number of other indigenous bushes and trees upon which cattle browse, and with plenty of water keep in good condition during a season of drought.

CONGRESS.—Mr. Napper said he would prepare a paper on "How to Produce your own Fertilisers," to be read at the forthcoming Bureau Congress.

WORMS IN HORSES.—Several members stated that they thought the poor appearance of many of the horses in the district was due more to worms in the stomach than to the absence of feed. In numbers of cases animals that had rapidly gone off in condition and died had on being opened been found to be literally swarming with worms, the intestines being almost perforated, and around these semi-perforations calculus (?) lumps had formed. Mr. Napper said he found the following a reliable remedy for worms:—Give a small wineglass of turpentine in a pint of new milk on an empty stomach, followed in about an hour's time with a pint of raw linseed oil.

SPARROWS.—Mr. Chalmers stated that the sparrows were destroying the buds of his almond trees, and asked whether there was any means of keeping them away from his trees. [Feed them well with wheat, and then with poisoned grain.—GEN. SEC.]

FIELD TRIAL.—It was decided, on account of the lateness of the season and weakness of stock, that the annual trial of stump-jump ploughs should be allowed to lapse.

### Redhill, August 9.

Present—Messrs. F. Wheaton (Chairman), A. A. Robertson, L. R. Wake, D. Steele, D. Lithgow, A. Stone, H. Darwin, R. B. P. Bailey, and T. McDonald (Hon. Sec.).

FIELD TRIALS.—Delegates were appointed to attend meeting to be held at Crystal Brook to form a field trial society in connection with Bureaus in the district.

WHEAT.—A discussion took place on the best varieties of wheat for this district. Mr. Steele said they should pay more attention to time of sowing and character of soils, as wheats varied in their requirements. His experience was that the early maturing wheats should not be sown too early in the season. With Steinwedel in particular he found it invariably a failure if sown very early. He found Scotch Wonder did not do well on clay soils, but could recommend Fillbag, with which he had had considerable success. Mr. Lithgow agreed with Mr. Steele; he considered Purple Straw a good wheat to grow. Mr. Wake recommended Leak's Rustproof, Budd's Rustproof, and Australian Wonder as being prolific, rust-resistant, and of good milling quality. Mr. F. Wheaton favored good selected Purple Straw, Leak's Rustproof, and Bearded, and for hay White Tuscan. After further discussion, it was decided that Fillbag, Leak's Rustproof, Early Para, Budd's Rustproof, Australian Wonder, Bearded, White Tuscan, and Purple Straw were suitable wheats for this district.

### Bute, August 9.

Present—Messrs. A. Schroeter (Chairman), H. Schroeter, W. Langsford, R. C. Commons, W. H. Sharman, J. J. Chapman, E. Ebsary, R. Fulwood, S. Lamshed, M. Stevens, J. H. Barnes, D. Green (Hon. Sec.), and one visitor.

**FIELD TRIALS.**—Matters in connection with the Northern Yorke's Peninsula Bureau Field Trial Society were discussed.

**RAINFALL.**—Recorded by Mr. Schroeter for July, 2·615in.; by Mr. Stevens, 2·795in.

### Cherry Gardens, August 10.

**Present**—Messrs. J. Potter (Chairman), J. Lewis, C. Lewis, J. Choate, W. Nicollie, T. Jacobs, J. Nicollie, G. Brumby, J. Mackereth, J. Metcalf, G. Hicks, J. Richards, E. Wright, R. Gibbins, C. Ricks (Hon. Sec.), and four visitors.

**POTATO PEST.**—Mr. Potter tabled specimens of grubs which were proving very destructive to potatoes.

**CODLIN MOTH.**—After some discussion on the subject, the following resolution was passed:—"This Branch supports the Government in its endeavor to check the spread of the codlin moth, and strongly urges that the Act and new regulations, except as regards compulsory spraying, be strictly enforced; and that the Central Bureau and the Inspector of Fruit should undertake experiments to prove the efficacy of spraying with Paris green, and, if successful, next season make it compulsory for every owner of an infected garden to spray his trees.

### Lyndoch, August 6.

**Present**—Messrs. H. Kennedy (Chairman), W. Rushall, M. Burge, W. J. Springbett, W. J. Lawes, A. Springbett, J. Davidson, and J. Mitchell (Hon. Sec.).

**FRUIT PESTS.**—It was decided to support the amendment of the Vine, Fruit, and Vegetable Protection Act as proposed by Tanunda Branch.

**OFFICERS.**—Messrs. H. Kennedy and J. Mitchell were re-elected Chairman and Hon. Sec. respectively, and thanked for past services.

### Calca, August 7.

**Present**—Messrs. J. Bowman (Chairman), W. Wilcott, A. B. Smith, A. Plush, E. A. Roberts, T. P. Cash, D. P. Thomas (Hon. Sec.), and one visitor.

**PAPER.**—Mr. Plush read a short paper on "Grafting Apple Trees"; and Mr. J. Bowman read one on "Mistakes I have Made in Farming," of which the following is the substance:—

An expensive mistake I made was in ploughing the land before the grass had grown properly. I ploughed 200 acres too early, and only got 3bush. per acre, whereas if done at the proper time fifty acres would have given at least 8bush. per acre, and would have saved three-fourths of the trouble and expense. Then, again, some of my paddocks contain stony rises, and in order to make the lands longer I have ploughed across these and found that the crop obtained on these rises would not more than pay for repairs to machinery. Another great mistake I made was to run short of seed wheat, in consequence of which I obtained several bags of wheat that was dirty, and now a good portion of my land is so dirty that I have been unable to get it clean since. Then, again, in fencing new land, by a mistake I put wire netting on the lower side of the fence, with the result that when it rains heavily the netting is washed away. The netting should be put on the higher side of the posts. Another mistake I made was in not destroying a few plants of a bush which I noticed stock would not touch; now the plant has spread over a considerable area, and is very difficult to eradicate.

**SEED EXPERIMENTS.**—Mr. Plush reported that owing to the bad season most of his experiments with seeds were failures. He obtained some 3lbs. of good grain from eighty plants of Gravestock's Frampton wheat.

**RAINFALL.**—For July, 1·280in.

### Nantawarra, August 9.

Present—Messrs. S. Sleep (Chairman), J. W. Dall, F. Pridham, E. J. Herbert, A. F. Herbert, R. Nicholls, H. J. C. Meyers, C. Belling, Jas. Nicholls, A. L. Greenshields, and T. Dixon (Hon. Sec.).

**FEED FOR STOCK.**—Mr. Greenshields mentioned that he had been feeding his horses on molasses mixed with cocky chaff, or chaffed straw. He gave each horse about 1½lb. of molasses daily with the chaff or straw, and they did very well on it. The Hon. Secretary said a neighbor of his had been feeding boiled prickly pear leaves to cows with good results.

**MANURING.**—The practice of drilling wheat in with manure is being tried this year in this district. About 300 acres have been sown in this way: superphosphate and Thomas phosphate at the rate of 100lbs. per acre, and a mixture of 40lbs. fowl manure and 100lbs. of dry wood ashes being used. Up to the present the crops manured with superphosphate have grown best; those with Thomas phosphate next. From the appearance of the crops manured with fowl manure and ashes, the labor of gathering this will be amply repaid.

**PAPERS.**—Papers were read by Mr. Pridham, on "Fixing the Selling Value of Wheat"; by Mr. Dall, on "Desirable Arrangements to Facilitate the Better Working of the Farm"; and by Mr. Belling, on "How to Manage a Farm Successfully." The following is the substance of Mr. Belling's paper:—

In this paper I intend to show how I consider a farm of 2,000 acres or thereabouts, containing about 300 acres of waste land, should be managed. Grazing must be combined with cultivation, and you must first divide your land into paddocks of suitable size, say of 200 acres each. From 500 to 600 acres should be under crop each year, and the rest of the farm will pasture 500 to 600 sheep. Great care must be given to stocking the land. About eighteen good working horses with plenty of muscle will be required. I prefer the Clydesdale, as they are powerful, active, and good movers. The best mares should be mated with a suitable horse, and enough young stock raised to replace the old ones. Three or four light horses for saddle and trap work should also be kept. Three or four cows are necessary; in this district this will be sufficient to supply butter and milk for household purposes, but where it will pay to go in for dairying more cows should be kept. I find the number of sheep mentioned is sufficient in an ordinary season; a few less would be better in a dry one. Overstocking is an evil which many farmers and squatters fall into, and the experience of the past season should teach us a lesson not to be forgotten. Two or three hundred lambs can be raised every year, and I find the cross between the Merino ewe and Southdown ram very profitable. The lambs are good doers, and mature early, being marketable at four months on good feed. It is a mistake to have too many early lambs, as there would then be too much stock to feed when the grass is young. It would be better to have less, and when feed is more plentiful buy a few store sheep to eat any surplus feed in spring time. A few pigs should be kept, but not kept in the styes all the year. The young pigs do better running in the paddocks, but must of course be kept in when they would be likely to damage the crop. Poultry pay handsomely when properly cared for, and 80 to 100 fowls can be kept.

**Improvements.**—The fencing must be sheep-proof, as it does not pay to shepherd. Then there should be a dam in each paddock, or at least access to dams should be made from each paddock. Where good water is not available by sinking, three or four large underground cemented tanks will be invaluable. Every farmer should provide water-holding capacity sufficient to carry all his stock for twelve months. Proper stables, warm and well ventilated, must be provided for stock.

**Cropping.**—Fallowing should be completed before the end of August; I find early fallowing pays best in this district. The land is benefited by being in an open condition during spring, and a better tilth can be obtained by harrowing it down early in the season. By finishing early the brood mares can be worked without any risk. Crop the land every third year. The first year it is out let the horses and cattle run on it, and the following year sheep; always let the sheep follow horses and cattle, as the latter do not seem to do so well after sheep. In an average season seeding should be commenced in the middle of April and finished by end of May. The seed and manure drill is now being tried in this district, and will undoubtedly modify present practices.

*Feed for Stock.*—The providing of feed is one of the most important matters the farmer has to deal with. In a good season a good stack of hay should be saved and all cocky chaff preserved; a shed large enough to hold two years' provision for your own stock can easily be filled in a good season. The straw should be also stacked, and, if properly roofed or otherwise protected, will remain good for several years. Last year we sold over 1,000 bags of cocky chaff which we had saved, and this year cut 500 bags of straw from an old stack. This is certainly better than using old roofs of sheds. I know of instances in this district where straw that has been on the sheds for six or seven years has been fed to stock this year. To make the poor beasts eat such stuff as this or starve, and that in a district where total failures of crops are unknown, shows very bad management. I may say that in spite of the low prices that have of recent years prevailed for much of our produce, we have, by working our farm on the lines indicated in this paper, made both ends meet, even during the very dry season through which we have just passed.

The following is the substance of Mr. Dall's paper:—

I think I am correct in saying that the want of system in South Australian farm arrangements has led to much loss and inconvenience, made the farm work a drudgery, and has been the cause of so many of our young men leaving work, in which they should do good for themselves and their country, to seek employment in the city. The question is how is this state of things to be remedied, and I think the first thing to do is to assure ourselves that farming can be made to pay, and that good work will return a fair profit. To make things comfortable and cheerful the arrangements of the farm should be studied. It is a very noticeable feature that on many farms the buildings are on one side. This is a great disadvantage. The home should be as nearly as possible in the middle of the farm, as nearly every day in the year you have to visit some part of the farm, often with a team or flock or herd. By being in the centre of the farm much time and labor is saved. Good stabling and yards should be provided for all kinds of stock. To save time and labor the stables should be arranged so that the feeding can be done from the front. With the haystack, chaff-house, &c., placed in a suitable position much unpleasant work is saved, the task is performed more quickly, and there is less waste. Shelter should be provided for the cows. It is all very well to say cows should be trained to stand anywhere for milking. In fine cool weather this work is perhaps better done outside, but when it comes to rain and mud, or scorching sun and dust, the work can be better done under shelter. It is not much trouble to provide a small yard and shed. A good barn is an absolute necessity for the storage of seed wheat, implements, &c. How often are such things as the chaffcutter left without shelter to spoil in a few years, when a small expenditure would provide shelter and increase the usefulness of the implement. It will be objected that all this means expenditure, which you cannot afford. This reminds me of the farmer who could not afford to make a dam, and afterwards complained that it had cost him £70 in one season to cart water. You can afford to lose a lot of time, a percentage of your chaff, and in a few years the chaffcutter into the bargain, but you cannot afford a few pounds for a chaff-house. A good shed should be provided for machines and traps. We often find a farmer with a good trap, and no proper shed to put it in. This can easily be remedied. Only think of the stones which we bump over at seed time and harvest, and how much better it would be if they were gathered, whenever we have a little time to spare, and carted to where you want to build, or to the limekiln. If we did this, and kept our object in view, we would soon have them in our shed walls. Attention to fences is another important matter. How often do we see children that should be at school, out minding a few sheep or cattle, simply because the land is not fenced? Besides, stock do not give so satisfactory results when treated in this way, and the cost of the fence is soon lost. Again we hear the old cry "We can't afford it." But after all, if we form our plans and keep them in view, we can with an effort make these things right by degrees; and just in proportion as we get these conveniences, so do we get comfort and facilities for doing better. The farm pays better, we get a firmer footing, and, besides, more pleasure for our labor. Then the little things about the home are very often overlooked. This neglect, however, is often paid dearly for, and brings a bad name on farm life which it is far from deserving. I am pleased, however, to see that so many of our best farmers and members of the Agricultural Bureau are trying to remedy this, and feel sure their efforts will be successful. With implements and machinery, always remember good work cannot be done with bad tools. Even if the good machinery is expensive it is more economical in the long run. Our aim should be to get good things, and to get them as soon as we can. A separate stable for our trap and saddle horses, with a few stalls, would be a great comfort both to ourselves and to visitors. Gates and doors are also of some importance. If properly fixed and fastened they save time, and prevent young stock from learning the bad habit of throwing down rails. A little garden work not only adds to the appearance and comfort of the homestead, but makes the expense of housekeeping much less.

**Tatiara, August 7.**

Present—Messrs. G. Milne (Chairman), W. Montague, R. Scown, F. Smith, Thos. Stanton, H. Killmier, and W. E. Fisher (Hon. Sec.).

**MANURING.**—The Chairman reported having put in 100 acres with the seed and manure drill. He had used 120lbs., 130lbs., and 150lbs. phosphate on different parts, and had left a strip unmanured to check the results. He felt sure the practice of drilling the seed in with manure would be found of great advantage in this district. He favored a light harrowing after drilling, as this was of benefit in several ways. The Hon. Secretary was also trying experiments with the drill and different manures, and the crops were looking exceedingly well. He thought it would be better to use bonedust one year and mineral phosphate the next, in order to prevent exhaustion of the soil. The Chairman said  $\frac{1}{2}$ cwt. of Thomas phosphate contained sufficient phosphoric acid for a 30bush. crop. Mr. Killmier agreed with the Chairman that harrowing after drilling would be beneficial, and thought a chain fixed behind the drill would do. Mr. Scown said his drilled crop looked well, but was backward. He was afraid manuring with Thomas phosphate would exhaust the land, and favored using bonedust alternately with it. [Manuring with Thomas phosphate or other manure does not exhaust the land. Naturally the heavier crop resulting from the use of such manure removes more of the other constituents required by the plant than would a poor crop, but this can be replaced by putting on a mixed manure.—GEN. SEC.]

**ALGERIAN OATS FOR HAY.**—In reply to the Chairman, Mr. Stanton said he only used Algerian oaten hay last season, and his horses had never done so poorly before. Mr. Killmier he had had somewhat similar experience and believed a great deal depended upon the condition of the crop when cut. The hay was bitter if cut too early. Mr. Scown said his experience was quite satisfactory. His horses had done well on it in past seasons, and he attributed their not doing so well this season to the drought. What little grass they had had very little heart in it. The Chairman said his horses always did well on Algerian oat hay. Much depended upon the time it was cut; it should not be cut until the tips of the heads were nearly ripe. He was sure no better chaff could be had if properly managed.

**Minlaton, August 14.**

Present—Messrs. J. Martin (Chairman), A. McKenzie, H. Boundy, J. Fletcher, J. Bennett, John Anderson, M. Twartz, D. G. Teichelmann, R. Higgins, S. Vanstone, J. McKenzie, W. Correll, and Joseph Correll (Hon. Sec.).

**CONFERENCE OF BRANCHES.**—It was decided to hold a Conference of Southern Yorke's Peninsula Branches at Minlaton on September 18. Professors Lowrie and Perkins have promised to be present, and it was decided to invite members of the Central Bureau to attend. Visitors will be driven round the district to see the various crops put in with the drill.

**MARRAM GRASS.**—Mr. Twartz said he made a mistake in referring to the grass growing on the sandhills as Marram grass. It was a very similar grass, a good sandbinder, and cows were fond of it.

**Lucindale, August 7.**

Present—Messrs. E. Feuerheerdt (Chairman), A. Matheson, E. Hall, B. Feuerheerdt, E. Dutton, A. Dow, G. Nosworthy, L. McInnes, S. Tavender, and O. A. Witt (Hon. Sec.).



**MANURES.**—Members reported that a considerable quantity of manure was being used experimentally, and results would be watched with interest.

**INSECT PEST.**—Several members reported presence of cream-colored insects on roots of thistles boxthorn, &c. They thought it was a species of aphid.

**BIRD PEST.**—Mr. B. Feuerherdt reported that rosellas and minahs were eating the buds on peach trees. It was decided to ask the Central Bureau whether any spraying would prevent it. [Spray with powder and shot is about the only effective remedy.—GEN. SEC.]

**PRUNING AND SPRAYING VINES.**—Mr. McLane asked whether it was too early to prune vines at the beginning of July. Mr. Tavender thought July late, while Mr. B. Feuerherdt said the earlier the vines were pruned after all the leaves were off the better and earlier the crop. He considered it too early to treat vines with sulphate of iron and sulphuric acid for prevention of anthracnose; the best time would be when the buds were beginning to swell.

**RAINING CABBAGE SEED.**—In reply to question members thought the best way to raise good cabbage seed was to select the plants with the finest heads and allow them to go to seed without cutting, taking care that no other plants of the brassica family are in flower at the same time.

### Yankalilla, August 5.

**Present**—Messrs. G. H. MacMillan (Chairman), J. Grundy, T. Symonds, J. Mayfield, H. Leverington, G. Newbold, E. C. Kelly, J. R. Kelly, A. Wood, J. Tonkin, F. G. Raymond (Hon. Sec.), and two visitors.

**FEED FOR STOCK.**—Members mentioned that prickly pears boiled until soft had been fed to cows and pigs with fairly satisfactory results. Cheap potatoes have also been used for stock, and on several runs sheoaks have been topped for sheep and cattle to feed on.

**BLACK SCALE.**—Mr. Wood said he had noticed that the black scale on orange and olive trees, and oleander bushes, could be easily destroyed with Bordeaux mixture.

**DAIRYING.**—A discussion took place on the question of improving the quality of milk. It was generally agreed that by feeding the quantity of milk could be increased, but there would be scarcely an appreciable improvement in quality. The quality of the milk depended upon the breeding. Mr. Leverington reported that several of his cows had died suddenly. It was decided to bring the matter before the Chief Inspector of Stock.

**CABBAGE APHIDS.**—Mr. Symonds asked how to exterminate cabbage aphids. Members thought kerosene emulsion best for this. Mr. Newbold stated he mixed a little soot with the soil when planting and this seemed to have a good effect.

**YELLOW LEVIATHAN MANGOLDS.**—Mr. Wood tabled sample of Leviathan mangold weighing over 40lbs. which he had grown from seed obtained from the Bureau last August. It was grown without any irrigating on comparatively dry soil, and he considered the variety the best he had seen, and one of the most valuable of fodder plants. Mr. Mayfield said he had been very successful with this variety, and if he could have obtained it would have purchased a quantity of seed.

**MANURING.**—The Hon. Secretary read a paper on "Manuring," of which the following is the substance:—

Manuring must be carried out in a thoroughly systematic manner, and perfect records kept of experiments and results. No slovenly or haphazard work will ever pay. The first study should be the most suitable manure to apply. The utility of chemical fertilisers has passed beyond the experimental stage, but a certain amount of knowledge is required

in dealing with them. As stated by a recent speaker, the farmer needs both a scientific and a mechanical training, and should be able to use either a microscope or a sledge-hammer. Knowledge in nearly every branch of science is valuable to a farmer in carrying out his work. He must keep abreast of the agricultural science of the day. It is necessary to return to the soil the chief constituents removed with the crops grown upon it, but in respect to nitrogen it had been found that leguminous plants harbored on their roots millions of minute organisms (microbes), which possessed the power to abstract nitrogen from the vast stores in the air, and it was possible that, in the near future, farmers might be able to introduce these microbes in the form of a "pure culture," as is done by the dairymen in some places in respect to the manufacture of first-class butter. It was well known that the land would neither produce as good crop nor as good herbage as it did thirty to forty years ago, owing to the constant removal of necessary constituents of plant-life and the extermination by live stock of the more nutritious plants; consequently, resort must be had to fertilisers, and of these commercial fertilisers are most convenient, because farmyard manures are not sufficiently abundant, and are somewhat poor in respect to phosphoric acid and potash. It is necessary to find out what is deficient in the soil, and then ascertain the best and most economical way of supplying the deficiency. Professor Lowrie had stated that a deal of the land that had come under his notice was deficient in lime, and a farmer in the district had applied lime on a small patch, and already the difference is remarkable. Phosphoric acid is deficient in the soil throughout the colony. To find out which are the best fertilisers to apply, it is desirable to experiment on small plots with different kinds separately and mixed, and make most careful records of every item and result. Plants require a good many substances, but all except three are usually plentiful in every soil. The generally deficient elements are phosphoric acid, potash, and nitrogen. Cereals require most phosphoric acid. Vegetables require nitrogen, potash, and phosphates in the order given. Fruit trees usually exhaust the potash and phosphoric acid first. Green fodders need phosphatic and nitrogenous fertilisers, and pastures will benefit from bonedust and basic slag. Stable manure is bulky, and it requires large quantities to supply the necessary phosphates and potash, whilst the nitrates must be produced by decomposition of the organic matter therein. If left exposed to rain (and after fermentation, to heat) the nitrates will leach away or become volatilised and carried off as ammonia. Therefore, a good deal of care and protection is required in the management of farmyard manure, and its value can be greatly augmented by the addition of commercial fertilisers containing phosphates and potash. Farmyard manure often makes the land very dirty with weeds. Green manuring is worth attention. A farmer in the district had been burning stinkwort; but, as an experiment, ploughed under some of it whilst green. The crop was fairly good where the weed was ploughed under, but very poor where it was burned. It is also worth while to dress pastures during late winter or early spring with bonedust and basic slag, after loosening the soil slightly. When purchasing commercial fertilisers care should be taken to demand a statement of its constituents, in percentages of each, as there are great discrepancies in the value of manures sold under the same name and brand.

### Baroota Whim, August 14.

Present—Messrs. F. H. Flugge (Chairman), M. Pillion, F. C. Bessaen, T. J. Simper, A. Raneberg, J. F. Flugge, and C. W. Hoskin.

**DRILLING SEED.**—Members reported that one or two seed drills, without manure attachment, had been used in this district, but it was found that where the seed is ploughed in the results are equally as good as where the drill is used without manure.

### Gawler River, August 16.

Present—Messrs. T. P. Parker (in chair), J. Hillier, A. Bray, F. Roediger, H. Roediger (Hon. Sec.), and two visitors.

**FEED FOR STOCK.**—Mr. Parker said he had been feeding his horses on molasses and straw chaff, about 3lbs. molasses to half a bag of chaff being allowed to each horse. They preferred molasses to golden syrup, which he had also tried. He had also used copra cake dissolved in water. About 3lbs.

of cake per day kept them in good condition, but when working they required 5lbs. to 6lbs. daily. He considered copra cake a cheap and nourishing food in seasons of scarcity.

**SCALE INSECTS.**—Mr. Hillier tabled specimens of white woolly insects infesting lemon trees. Spraying had been tried with little result. Mr. Bray said the insect was known as the cottony cushion scale (*Icerya purchasi*), and recommended spraying with kerosine emulsion at a temperature of 160° F. Other members stated that they had seen this insect on native shrubs. [The cottony cushion scale is indigenous to Australia, and is found on many native plants. Owing to the prevalence of parasites it does not, however, usually exist in sufficient numbers to do much harm.—GEN. SEC.]

### Mount Pleasant, August 13.

Present—Messrs. F. Thomson (in chair), H. Dragomuller, J. Maxwell, H. A. Giles, and H. T. Hull (Hon. Sec.).

**CONGRESS.**—Mr. Giles promised to prepare a paper for Congress on "Portable Presses for Baling Straw."

**FEED FOR STOCK**—Members mentioned that the thick fleshy leaves of the American aloe had been cut into strips and fed to cows, which ate them freely. Furze or gorse crushed on stones had also been used. Mr. Giles said he had been feeding his cows on molasses mixed with steeped chaff and potatoes; also with copra cake—6lbs. potatoes and 2lbs. of copra meal, or 1lb. of oilcake per cow per day—cost 4s. per week. The cows were milked night and morning, and more than paid for the feed, and kept in good condition.

### Balaklava, August 14.

Present—Messrs. A. Manley (in chair), G. Reid, J. Vivian, A. Steinwedel, P. Anderson, and E. M. Sage (Hon. Sec.).

**FEED FOR STOCK.**—Members stated that the most generally used feed for stock during the drought had been the old straw from the shed roofs. Messrs. Sage and Vivian said their stock had lived on the native bushes on the sandhills. Mr. Steinwedel found copra cake too dear for general use. In Germany it paid to use, but it only cost about a sixth of what was charged here. Mr. Manley said he had been using molasses, sulphide of iron, and salt with wheat chaff, and kept his animals alive. [Information is required in these matters as to the quantity of the materials used, how used, and, if possible, the cost and results.—GEN. SEC.]

**FRUIT PEST LEGISLATION.**—Members favored the proposed amendment of the Vine, Fruit, and Vegetable Protection Act.

### Mount Gambier, August 14.

Present—Messrs. J. Umpherston (Chairman), Thos. Edwards, A. J. Wedd, G. G. Collins, W. Barrows, J. Dyke, James Bowd, W. Mitchell, J. Watson, M. C. Wilson, J. C. Ruwoldt, T. H. Williams, and E. Lewis (Hon. Sec.).

**FEED FOR STOCK.**—The Chairman said more use could be made of straw, with which molasses went best. It was stated the price delivered at Mount Gambier was £10 per ton. Mr. Williams said one ton of molasses would do for 56 tons of straw. Mr. Wedd said the more lucern they could grow the

better, but Mr. Mitchell pointed out that in this district the land was cropped in rotation, and if they got lucern in the soil they would find it hard to get it out. Mr. Wedd said it was a good practice to sow oats early in the season. Many had sown oats in April and turned the cattle in when the crop was about 18 in. high. Small potatoes and mangolds were also recommended for dairy cows.

**GAS TAR AND FRUIT TREES.**—Mr. Williams said a few days ago an instance came under his notice where fruit trees had been dressed with gas tar with splendid success. Two years ago some peach trees which from various causes had not matured fruit for years were treated, the roots being bared and left until the earth adhering to them had dried. This was then brushed off and warm gas tar applied, no injury apparently having been done to the roots or to the trees, which have since borne heavily. Similar treatment had been given to apple trees affected by American blight with good results.

**LICE ON SHEEP.**—Mr. Williams said that a flock of ewes and lambs which had been dipped had come under his notice. The flock had thriven splendidly since the dipping. All sorts of things had been said against dipping ewes and lambs, but here was evidence that they thrived well afterwards. In reply to a question as to whether dipping sheep in the wool injured the fleece, Mr. Williams said there had been ample demonstration that this was not the case, but that in fact a marked improvement in the weight and quality of the wool had been the result of dipping. Some of the most practical men in the district were dipping sheep in the wool, and 1,500 longwool sheep had been put through that week. It was necessary to keep the sheep in longer when dipping in the wool, say for a minute.

### Murray Bridge, August 14.

Present—Messrs. W. Lehmann (Chairman), J. J. Stecker, H. Schubert, H. Block, B. Jaensch, F. Wurm, R. Edwards (Hon. Sec.), and two visitors.

**PAPER.**—Mr. J. G. Neumann read a paper on "How, When, and Where to plant Forest Trees," with special reference to the Mobilong district. The following is an abstract:—

This subject will appear to many, including those who are interested in planting forest and ornamental trees, as one on which very little can be said, as the way, the time, and the place to do this are too well known. But in dealing with the subject in a more rational way we might find that many things which are connected with it have perhaps not been performed in accordance with the laws of nature. At first, let me give a concise list and a few short notes of some of our indigenous forest trees which grow in this and neighboring districts. Of the many eucalypts which are indigenous to the extratropical part of South Australia—that is, from Mount Gambier to the Macdonnell Ranges—only four or five are found in our district, of which several varieties of *Euc. gracilis*, or mallee, are the only ones which form extensive forests, commonly called scrub. Next to that is the redgum (*Euc. rostrata*), wrongly called by the early settlers "swampgum"; the true swampgum (*Euc. Gunnii*) is found in the South-East and a few other localities. This tree (the redgum) forms, or has formed, small forests on the margin of lagoons, or even in shallow water, and along the banks of the Murray. If planted on higher ground, away from the lagoons or river, I find it gets a deep, penetrating tap-root, and grows just the same as the redgum in the hills. The Cyprus pine (*Callitris robusta*) is another tree which forms in the Murray Valley extensive forests. Two slightly differing varieties are found in our district. Of the other trees I will only mention the sheoak (*Casuarina*), acacias, and the honeysuckle (*Banksia marginata*). Of the several kinds of trees we find dispersed here and there none has ever formed a native forest in our district, being in number and size quite insignificant. Besides the indigenous trees mentioned, a great many different foreign trees, either from the neighboring colonies or from other parts of the globe, have been introduced to South Australia, and some of them grow as luxuriantly in their adopted home as if they were indigenous, provided that they are planted in suitable soils and have sufficient moisture. But here it is where usually mistakes are made. People seeing some kinds of trees—for instance, oaks and pines (foreign conifers)—growing so nicely on the hilly parts,

where the rainfall is three or four times the quantity we get here, think they must just as well grow here. They are usually disappointed, as the soil, the moisture, and even the height above the sea has very much to do with the growth of such and other trees. My many experiments with foreign forest and ornamental trees have taught me that in our district mostly such trees should be planted which can withstand long droughts, and which are content with either the light sandy soil, or with soil chiefly composed of lime. The latter kind of soil is too porous, and that even in certain parts of our mallee scrub, where it predominates, the native pine shuns to grow on it. I can recommend the following:—Sugargum, redgum, Tasmanian bluegum, and our whitegum (*Eucalyptus leucosylon*), which are all of rapid growth. The whitegum has the peculiarity of accommodating itself to the soil, &c. Where abundant moisture is found in clay subsoil it grows tapering to a great height; in drier places it will have a more stunted stem, but usually a nice shady crown of dense foliage. Of the other Australian forest trees I may mention curra-jong (*Sterculia*), several species, natives of New South Wales; and lastly, our pines, she-oaks, and honeysuckles; and where neither of those mentioned would grow, then the last recourse would be mallee. Of the foreign conifers the *Pinus insignis* (remarkable pine of North America) and *Pinus halipensis* (Aleppo pine of Eastern Asia) here seem to grow best of all the pine tribe. The question, How to plant forest trees, can partly be answered by the well-known maxim, "What is worth doing is worth doing well." If you plant a tree you want it to grow, and look nice and healthy. No definite rule in regard to the size and depth of a hole in which to plant a tree, neither of the distance apart, can be laid down, as all depends on the soil and situation. [Trees should *never* be planted in holes, but the soil should be dug and broken fine to a regular depth all over. If planted in holes the roots travel around the sides instead of spreading. The water collects in the holes in wet weather and drowns the roots, whilst in dry weather the soil contracts and leaves an opening round the walls of the hole, and the roots are killed by drought and heat—(Gen. Sec.)] But as at present in our district, forest trees are mostly planted in small numbers for ornamental purposes. If large stones appear it is not necessary to remove them, as the roots will find their way into the crevices; but if a sandstone or limestone crust (travertine) is there, this must be pierced through, else the tap-root, with its lower rootlets, is hindered from going down to permanent moisture, and the tree will, after a few years, look sickly and cease to grow. When the trees are planted, press the soil down with your hands or feet, give it a soaking if the weather should be very dry, and water it no more in future, at least not close to its stem. The trees I have mentioned will grow, if properly planted, without artificial irrigation. I have planted some during the two last dry seasons, and I can say that nearly all of them have grown without getting any other water besides that from the clouds. Young trees should be protected by guards to keep off animals, such as cattle, dogs, and cats, and also mischievous hands. Three or four sticks and wire netting will do for a rough guard. The sowing of seeds broadcast in places where a forest is to be raised, as it is done in some countries, is not advisable here on account of our climatic conditions. The time most suitable to plant forest trees is from May to August. June and July are, for our part, preferable, as the young trees then get most of the winter rains. If trees can be planted on misty or showery days it is all the better. To plant trees on warm bright days, followed by frosty nights, has very injurious effects on them. I purposely made several experiments in this respect some years ago. I may mention here that some years ago I planted out a sugargum in December, and kept the ground around it moist for some weeks, when I saw that it began to grow. I left it then to itself, and it has now attained the height of 25 ft. and a proportionate thickness. If trees are planted on park lands or roadsides, corporations or councils will certainly do well to have the work done by some men on suitable days and in a proper manner. In conclusion, a few words as to *where* to plant forest trees. The answer may be short: Plant them where no fruit trees, vegetables, or cereals are grown; on streets, roadsides, park lands, cemeteries, &c.; and as breakwinds on farms, or perhaps here and there in the corners of paddocks, or on stony ridges, which yield only very precarious crops, a suitable place for a plantation might be found. Plant them by hundreds. The first beneficial result derived from such plantations, especially on roads and boundary fences, would be that those devastating storms, blowing the fields bare and causing sanddrifts, will to a certain extent be checked.

### Pyap, July 30.

Present—Messrs. K. F. Huselius (Chairman), C. Billett, G. Clarke, J. Holt, J. Harrington, T. Teale, H. Mills, A. J. Brocklehurst, W. Axon, J. Aird, T. Smith, F. Muirhead, E. Robinson, W. C. Rodgers (Hon. Sec.), and two visitors.

**FEED FOR STOCK.**—Members reported that stock had subsisted to a large extent on saltbush, bullock, sandalwood, and paddy-melons. They found that the stock simply existed on the bullock and sandalwood, there being very little nutriment in either. The latter appeared to taint the milk. The paddy-melons, which were a serious nuisance on cultivated land, proved very useful in times of drought, though from its fibrous nature it was injurious to horses.

**BACON-CURING.**—Mr. Clarke wished to know best method of curing bacon, and especially the best fuel for smoking. [See paper by late Mr. T. N. Grier-son in report of Sixth Congress of Agricultural Bureau.—GEN. SEC.]

**PIGS DYING.**—Mr. Smith said he noticed that many weaners when leaving the sow become coated with long hairs, their tails drop off, and they pine away and die. He would like to know what was the cause of this. [Will members of other Branches consider and answer this conundrum.—GEN. SEC.]

**SEEDING.**—Mr. Huselius referred to the necessity for more care in covering the seed on their sandy soils. It did not do to harrow more than once, and this should be across the furrows. A scarifier will not cover the seed properly, and the best way was to plough the seed in lightly. Seed has been put in various ways on the settlements this season, and the matter will be tested. Peas could not be properly harrowed in; ploughing or drilling was necessary.

**CROWS.**—Reference was made to the damage done by crows to the wheat crops, and to their killing young lambs and stealing eggs. [They also destroy myriads of locusts, caterpillars, mice, and other pests during the whole year.—GEN. SEC.]

**ANNUAL REPORT.**—The Hon. Secretary's annual report showed that during the year twelve meetings were held, with an average attendance of eleven members. Many practical matters have been discussed, experiments with seeds carried out, and a careful watch kept for any pests, such as weeds, insects, and fungi likely to be injurious, and information dealing with same has been distributed. Generally the existence of the Branch has proved a decided advantage to the settlement.

### Colton, August 7.

Present—Messrs. P. P. Kenny (Chairman), J. L. Higgins, G. Mayers, M. L. Crowder, John Shipard, E. Whitehead, W. J. Packer, R. Hull (Hon. Sec.).

**FEED FOR STOCK.**—Mr. Shipard stated he had in the previous seasons gathered as much straw as he could, and stacked it, giving each layer a liberal sprinkling with crude salt from a lake close by. He found his horses took to this readily and ate nearly all of it. Large quantities of sheoak leaves have been broken down for sheep.

**PAPER.**—Mr. Packer read a paper on "How to Dispose of the Stones on Cultivated Soils," of which the following is the substance:—

This matter is of very great importance to many farmers, and has been receiving a great deal of attention from the farmers of Yorke's Peninsula, and several trials of stone-gathering machines for prizes offered by the Government have been held, but nothing satisfactory has resulted. Every year we plough up more stones, causing much loss of time and expense through breakages, besides adding to the draught of all implements. The question is, which is the best way, to clear them off the land or make them so that there would be no risk of breakages. This is where I should be glad of the experiences of other members of the Bureau. Some people cart the stones off the field with infinite labor, while others break them up with a hammer on the field, as by atmospheric action they decompose more readily and enrich the soil. This, however, is very hard rough work, and, as Professor Lowrie pointed out when asked the question, it would pay better to cart off the stones and with the money saved put on a good fertiliser. Some tell me that they have made things worse by carting away the stones.

Mr. Mayers said he first tried carting the stones away, but found it very laborious; he then tried smashing them up upon the land, and was of opinion that it had a beneficial action on the soil. Mr. Higgins said he made use of large quantities of stone from his fields for putting round wire netting, filling up rabbit burrows, &c.

**MANURING.**—Mr. Packer reported on experiments being conducted with commercial fertilisers in this district. About thirty acres had been put in with the drill, various manures being used. These crops look better than the unmanured portions, Thomas phosphate giving the best promise so far. On some poor white sandy soil at Elliston, which has been manured with scrapings from the hotel yards, the wheat looks splendid, and is a good object lesson on the advantages of manuring. Mr. Higgins said he had manured with stable manure which had lain in a heap for years, but the wheat grew very rank, became blighted, and was too coarse for hay. Mr. Shipard said the manure should be carefully gathered into pits and only used when thoroughly rotted. If used "green" it was too heating.

**DEPTH TO SOW WHEAT.**—Mr. H. Shipard forwarded several plants of wheat grown by himself as an experiment to test the question of depth to sow. Where the seed was put in from 3in. to 6in. deep the plants formed secondary or "adventitious" roots from the stem near the surface, and the lower roots apparently died. Grain that was broadcasted and harrowed in made much better roots.

### Watervale, August 9.

Present—Messrs. C. A. Sobels (Chairman), W. Smith, H. Beck, T. Stewart, A. Leithbridge, E. Treloar, and E. E. Sobels (Hon. Sec.).

**ALGERIAN OATS FOR HAY.**—Mr. Stewart considered the best time to cut these oats for hay was just before the ears colored, as there is then more weight and substance in the straw. By leaving them until they have turned color there is too much risk of loss from the grain falling out.

**COPRA CAKE.**—Members found this a good and quick fattening food for stock, but it was too expensive to be very largely used. Mixed with a little pollard it was good for fowls

### Narridy, August 14.

Present - Messrs. A. Bairstow (Chairman), W. J. Porter, W. J. Martin, H. Nicholls, A. McDonald, D. Creedon, and J. Darley (Hon. Sec.).

**DAIRYING.**—A discussion took place on what was a profitable return from a cow. Mr. Porter said an average of 1½galls. a day, or 456galls. yearly, would give, say, 182lbs. of butter, which at 9d. per pound would produce £6 16s. 6d. This he thought was a fair average price, and the skim milk, say 411galls., would be worth at least 8s. 8d., making a total value of £7 5s. 2d. Her keep would cost 1s. per week, or £2 12s. per annum; interest on separator, dairy utensils, and cow, £1; labor for milking and making butter, £1 17s. 11d.; allowance for depreciation of cow and utensils, £1, or a total of £6 9s. 11d., leaving balance to profit of 15s. 3d. Mr. Bairstow said they would need to keep ten cows and a bull to make the business pay. They could only reckon on the cows being in milk for nine months, and should expect a return of 3s. per week per cow. This would give £54 per annum, from which they must deduct £6 5s. as rent on 100 acres required to keep the ten cows and bull, and about £37 15s. for wages for girl and other expenses, leaving a profit of £10. Mr. Nicholls considered these estimates very moderate, but pointed out that no provision was made for deaths occurring. Mr. McDonald

also considered these estimates low. He knew of a case where cows gave 14lbs. of butter per week when the natural feed was at its best. [The above estimates are open to criticism by all Branches of the Bureau.—GEN. SEC.]

**FERTILITY OF THE SOIL**—The Hon Secretary called attention to report of discussion at meeting of Redhill Branch, on the difference in yields obtained twenty years ago from virgin soil and the yield they now got. It was stated that 20bush. to 30bush. per acre used to be frequent, whereas now they scarcely got more from virgin land than from old soil. He was of opinion that the deterioration of the soil was due to the heavy grazing; but other members did not consider grazing affected the fertility of the soil. Mr. McDonald said the 30bush. crops referred to were rare occurrences.

### **Riverton, August 14.**

Present—Messrs. H. A. Davis (Chairman), D. Kirk, T. Gravestock, M. Badman, F. Badman, J. H. Kelly, J. Kelly, and H. A. Hussey (Hon. Sec.).

**MANURING**.—It was resolved to visit a number of prominent farms in the district on September 1 to inspect the results of manuring with the drill and broadcasting.

### **Maitland, August 7.**

Present—Messrs. C. F. G. Heinrich (Chairman), A. Jarrett, Thos. Bowman, J. Smith, H. R. Wundersitz, H. Pitcher, J. S. McLeod, J. Kelly, C. W. Wood (Hon. Sec.), and visitors.

**FEED FOR STOCK**.—Mr. Kelly strongly advocated the use of the binder and disc-header for harvesting wheat crops. All the straw should be saved for stock. Mr. Hill tabled splendid specimen of mustard over 3ft. in height, and spoke well of it as a green fodder.

### **Mundoora, August 13.**

Present—Messrs. J. Blake (Chairman), G. Haines, W. Atkinson, T. Watt, W. Aitchison, D. Smith, W. Longmire, N. J. Francis, W. J. Shearer, H. M. Smith, A. E. Gardiner (Hon. Sec.), and two visitors.

**FEED FOR STOCK**.—Mr. Watt strongly advocated the use of the binder and disc-header for harvesting the wheat crop. This was also the easiest and best way of getting together a substantial stack of straw as provision for stock in such a season as they had just passed through. Members agreed with this, but pointed out that there were difficulties in the way of many farmers doing this, the principal one being the heavy expense for the binder and header, which those with limited means could not afford. Mr. Atkinson said his horses when not working had been fed on straw of which he had an old stack. He did not chaff it, but allowed them to pull it out from the stack. In this district much difficulty is found in using the ordinary wheat straw, owing to the presence of so many small sticks, roots, &c. A farmer in the district has, however, got over the difficulty by attaching a tarpaulin to the tail of the winnower, and passing the chaff as it comes from the cutter over the second finest sieve; the hard knots are sent down the screen, the small pieces of stick down the spout, and the light chaff goes over the tail into the tarpaulin.

**WHEAT FOR SEED**.—Mr. Haines reported having tested the germinating power of wheat harvested in various ways. He sowed 100 grains in each case with the following result:—Hand-thrashed seed, 95 grew; binder and header, 87 grew; various makes of strippers, 85 to 87. He intended carrying out further tests next season.



### Yorkestown, August 14.

Present—Messrs. J. Koth (Chairman), A. Jung, J. Latty, G. Bull, T. Corlett, C. Domaschenz, J. H. Thomas, F. Siebert, and J. Davey (Hon. Sec.).

MINLATON CONFERENCE.—Matters in connection with the Conference of Branches to be held on September 18 at Minlaton were dealt with. Mr. Domaschenz promised to read a paper on "Destroying Weevils in Barns."

ANNUAL REPORT.—The Hon. Secretary read his annual report. Messrs. J. Koth, C. Domaschenz, and J. Davey were re-elected Chairman, Vice-chairman, and Hon. Sec. respectively.

### Appila-Yarrowie, August 13.

Present—Messrs. J. H. H. Bottrall (Chairman), J. C. W. Keller, J. M. Grant, A. Fox, C. W. H. Hirsch, W. C. Francis, J. Daly, J. O'Connell, N. Hannagan, and C. G. F. Bauer (Hon. Sec.).

FEED FOR STOCK.—Mr. Bottrall said he had mixed straw chaff with bran and pollard, and his stock did well on it. Some of his neighbors had used molasses with straw chaff, but the results were not satisfactory. Members were of opinion that straw cut with the binder early in the season was much better than straw gathered after stripping. Mr. O'Connell said it is a good plan to cut the straw with the mower directly after harvest and stack it at once. Members considered wheaten chaff to be much better than straw chaff. Some discussion took place on the question of lucern-growing in this district. It was agreed that it is best to put the seed in with the drill.

SPRAYING FRUIT TREES.—The members desired to record their appreciation of the services rendered by the members of the Angaston Spraying Committee, whose work has resulted in the almost general adoption of the practice of spraying for the suppression of fungus diseases.

### Crystal Brook, August 14.

Present—Messrs. W. J. Venning (Chairman), J. G. Young, George Davidson, W. Natt, J. Allen, J. Chambers, J. Forgon, and George Meill (Hon. Sec.).

FIELD TRIAL SOCIETY.—On August 21 delegates from Crystal Brook, Port Pirie, Redhill, Narridy, and Gladstone met and decided to form a society, to be called "The Crystal Brook Field Trial Society," for the purpose of holding field trials of agricultural implements.

FRUIT-GROWING.—Mr. Young tabled splendid samples of Lisbon lemons from three-year-old trees, showing that this tree is well suited to the district. He also stated that every season his peach trees dropped large quantities of fruit buds. He had on previous years attributed it to the sparrows, but this year the sparrows are scarce, and still the buds have been dropping as badly as ever. By giving the trunk a light blow the buds fall to the ground. The trees are of luxuriant growth. He would like to know the cause of this, and whether it could be prevented. [Probably due to some cause which prevents the proper maturing of the buds, such as want of water at the proper season, or to weakness due to the absence of some necessary constituent from the soil.—GEN. SEC.]

MELONS.—Mr. Allen wished to know what constituents watermelons took out of the ground, and how the same could best be replaced. Melons do not thrive well on the same land two years in succession. [Watermelons and others of the same family require a deep, light soil, rich in vegetable humus. American writers advise manuring the ground very early in spring with

well-rotted leaf mould or manure, or with fresh manure well worked into the soil in the autumn. Melons draw largely from the soil phosphoric acid, potash, and nitrogen. The latter is supplied as mentioned, while fresh dry wood ashes will supply the potash, and superphosphate will provide the phosphoric acid. The crop should not be grown on the same land year after year.—**GEN. SEC.**]

**DRILLING WHEAT.**—The Chairman said that the plots put in with the seed drills on occasion of the public trial of drills on April 7 were coming on well, and as five different kinds of manure were used it would be a splendid test as to which suited his soil best. Already some of the plots were much in advance of others.

**RAINFALL.**—For July, 2·605in.

### **Port Broughton, August 14.**

Present—Messrs. R. W. Bawden (Chairman), H. M. Peel, J. Harford, W. Tonkin, W. Bennier, B. Excell, James Barclay, George Pattingale, I. Rayson, and S. M. Bawden (Hon. Sec.); R. Barr, D. F. Kennedy, and J. J. Lewis, of Pine Forest Branch; and George Haines, of Mundoorra Branch.

**ANNUAL REPORT.**—The Chairman's annual report showed that during the past year nine meetings were held, with an average attendance of nearly eight members. He regretted that the attendance had been so poor, and that not a single paper had been read during the year. The Branch had done, and was capable of doing more, good work in the district, but the members would need to show more active interest in their work. It was decided to hold meetings in the evening in future, on the Monday before each full moon. Mr. Harford promised to prepare a paper on "Manures" for following meeting.

### **Port Germein, August 23.**

Present—Messrs. P. Hillam (in chair), E. McHugh, W. Crittenden, H. H. Glasson, T. S. Marshall, J. K. Deer, W. Mortess, W. Head, W. Broadbear, and H. J. Gluyas (Hon. Sec.).

**PLEURO-PNEUMONIA.**—A question was asked through the question-box as to whether inoculation was a preventive of pleuro, and considerable discussion ensued. Mr. Head read extracts from several authorities which were conflicting, and it was decided to ask the Chief Inspector of Stock. [Mr. Valentine states the Stock Department has proved that inoculation is distinctly beneficial, but it is essential that the virus be good and pure.—**GEN. SEC.**]

**WHEAT EXPERIMENTS.**—Several members reported on trials with new wheats received from the Bureau, and most of them noticed an improvement in quality after first sowing.

### **Eudunda, August 9.**

Present—Messrs. C. Wainwright (Chairman), A. Kluske, J. W. Kriebel, C. Pfeiffer, A. M. Twardt, J. A. Pfizner, F. W. Paech, G. A. Hilbig, H. D. Wiel, J. von Bertouch, and W. H. Marshall (Hon. Sec.).

**FEED FOR STOCK.**—Owing to the extraordinary severity of the drought feed has been very scarce, and most of the farmers have been compelled to pull the old straw roofs off their sheds to feed the stock. This, mixed with copra cake, bran, and wheaten chaff, has been largely used. Those members who had used copra cake with straw considered it superior to bran, as, though cows produced less milk, the cream was richer. Molasses was found too expensive as compared with bran and copra cake.

### Clarendon, August 12.

Present—Messrs. James Wright (Chairman), H. Payne, W. Spencer, A. A. Harper, J. Piggott, W. A. Morphett, and A. L. Morphett (Hon. Sec.).

**FEED FOR STOCK.**—The Chairman said he knew of one farmer who cuts and stacks the star thistle, and feeds it to cattle with satisfactory results. [Does he cut it when young, or does he wait until it is dry, fibrous, and woody?—GEN. SEC.]

### Pine Forest, August 17.

Present—Messrs. J. Phillis (Chairman), J. J. Lewis, J. S. and J. Mudge, S. F. Kennedy, A. Mudge, W. H. Jettner, J. Miller, G. Zilm, A. Inkster, C. Donaldson, W. Wurfel, R. Barr, jun. (Hon. Sec.), and a large number of visitors.

**HOMESTEAD MEETING.**—This meeting was held at residence of Mr. Wurfel, members being accompanied by the families and friends to the number of over 100. After the Bureau business had been dealt with, members and visitors were entertained at tea, and music, dancing, and games followed.

**PASSES FOR CONGRESS DELEGATES.**—Considerable discussion ensued on the question of granting free passes to delegates attending Bureau conferences and congresses. It was finally decided that the members could not attend the Annual Congress in the absence of free passes.

**JUDGING IMPLEMENTS BY POINTS.**—The Hon. Secretary read the following paper on this subject:—

The principle of judging farm implements, such as ploughs, scraifiers, seed and manure drills, &c., in operation is pronounced by all practical men to be not simply the best, but the only possible way to do so satisfactorily, while the system, now generally followed, of "judging by points" at such trial is conceded to be the best method of arriving at an accurate decision concerning their utility and capabilities.

It must, however, be apparent to anyone reading the published accounts of the late field trial at Bute, and who notes the aggregate number of points awarded by the different sets of appointed judges, that no very great unanimity exists amongst them as to the value of such points, for while some may have been lavish in their use, there were those so niggardly that it gave one the impression they valued each point at 20s. which had to come out of their own pockets—a serious item these times. Provided all these headings were used by the judges of five-furrow ploughs—easy jumping, 25; construction and durability, 25; packing furrows, 15; price, 10; lightness of draught, 10; all round work, 15 = 100—it is a ridiculous position to award only 48 and 45½ points to two of the competing ploughs. The "judge's card" as above may be open to criticism, but it was issued by the society, and ought to have been so far respected by the judges appointed as to be acted upon to the best of their ability. In the absence of the dynamometer it was of course only possible to guess at item "Lightness of draught," but there yet remains 90 points, and taking 66½ as the number awarded for the best five-furrow plough on the ground, the inference undoubtedly is that that class of implement is a long way short of perfection, and I ask, "Is it?" My opinion is that the best implement in each section of plough exhibits competing at the last field trial was as nearly perfection as it is possible to imagine, while the others were certainly not a disgrace to the makers, as the figures 48 and 45½ would lead any one to suppose. The portion of land operated on was, when finished, a credit alike to the makers of ploughs and the ploughmen, and a pleasure to beholders, presenting a uniform appearance to the casual observer of good work throughout. Every plough finished the task allotted to it in time and without accident, and I think the question is reasonable—"Was the worst plough on the ground not entitled to an advance on 45½ points out of a possible 100?" To those who have not studied the matter in all its bearings it may seem congruous for a judge to award, say, 8 points out of a possible 25 for "Construction and durability" as a protest against some weak or faulty part, but it seems to me he could not be more severe if the whole plough was composed of hoop iron, and doing the like with item "Easy jumping" certainly implies that the plough "hung up" on two-thirds of the total number of stumps encountered. No insinuation is made that any one plough was misplaced by the judges in the order of awards. It is more difficult to do an injustice to that extent under the system of "judging by points" than any other, but

the details were not followed out in a logical manner; consequently its value was greatly impaired. Does any reason exist, beyond the confines of usage, why the maximum number of points should not be awarded for one or more perfect features in an implement? It may not be faultless in every respect, but provision is made for declaring defection where it belongs. It is the very essence of the system that each individual feature may be appraised, for the benefit alike of maker and user. Take "Easy jumping" for instance, and suppose a plough so constructed as to negotiate successfully with every stump met. Has a judge a right to take even one point from the maximum allowed and enter 24 on his card instead of 25? He can have no such right, and to do so defrauds the maker of his just due, while to relegate an implement, the perfecting of which may have been the life-long labors of a man, and a genius at that, to something below mediocrity without rhyme or reason is cruel, and amounts to robbery of the worst kind. It is right for an appointed judge to express, in the strongest terms, disapprobation of a worthless article, and a verdict of "Not worthy" may be unpleasant all round. It is, however, in such case, the bounden duty of a judge to return it, either by words or figures; but because the system is not so well understood as it might be and some of the gentlemen who have acted as judges in the past do not realise the importance, to exhibitors, of each and every point dealt with that I present this paper to the Branch, and incidentally to the Field Trial Society. As a member of that society I desire for it continued success, and, although it is impossible to please everyone, it must be admitted that our patrons have had cause for complaint in the past, and unless we wish to dishearten or disgust competitors advancement must be made in respect to judging. The following "judge's card" for ploughs is respectfully submitted as an improvement on last:—Construction of plough: (a) Simplicity, 10; (b) ease of management, 10; (c) durability, 15; (d) easy jumping, 20, evenness of work, 15; packing furrows, 15; price, 15; maximum, 100. And I suggest that all judges' cards be published *in extenso* in future, with name attached. "It will not be possible to procure judges to act under that condition," said one gentleman in reply to the above suggestion. I think it will, and good judges too. At any rate, my feeling in regard to the matter is that anyone asked to officiate in a given section who would be ashamed of the publication of his unaided estimate of the exhibits, and who could not, if challenged, give a reason for each point awarded or withheld, ought certainly to decline the position.

Members considered this paper very opportune, being calculated to work a much-needed reform, and it was indorsed by the Branch.

**MANURES**—Mr. J. W. Lyon gave an interesting address on "Manures and Manuring," giving the result of his observations. He strongly recommended the use of the seed and manure drill, and was confident that those farmers who did so would get a satisfactory return.

### Boothby, August 17.

**Present**—Messrs. J. T. Whyte (Chairman), R. M. B. Whyte, E. Bradley, M. Leonard, J. Bell, R. Chaplin, A. Turnbull, and G. T. Way (Hon. Sec.).

**SEASON**.—Members reported that owing to the light rainfall their gardening operations had been disappointments.

**CO-OPERATION**.—A discussion took place on the advantages of co-operation, and it was decided to endeavor to get sufficient shares in the South Australian Farmers' Co-operative Union taken up in order to get a branch of the same established in the district.

**ENSILAGE**.—A long discussion on this subject ensued. Mr. Turnbull objected to ensilage on account of its bad smell. [The cows like it, and it is good for them and profitable to the owner of the cows.—GEN. SEC.]

**MALLEE STUMPS**.—Most of the members considered it unwise to burn the mallee stumps picked off the cultivated land. If these are collected into large heaps they will in time become of sufficient value for firewood to pay for keeping.

**FIELD TRIALS**.—Matters in connection with a public trial of stump-jump ploughs to be held on September 14 were dealt with.

**Renmark, August 7.**

Present—Messrs. F. S. Wyllie (Chairman), E. Taylor, W. H. Harrison, R. Kelly, and W. H. Waters (Hon. Sec.).

**FRUIT PEST LEGISLATION.**—Communication from Tanunda Branch in reference to proposed amendment of the Vine, Fruit, and Vegetable Protection Act was discussed. Members did not consider it advisable for the Branch to support the proposals at present.

**ALKALI SOILS.**—Mr. Harrison read a paper on "Alkali Soils and their Treatment with Gypsum," prepared by the Chairman of the Central Bureau. Members stated the recommendations made in the paper had been carried out here for some considerable time. There is a splendid deposit of gypsum within easy reach of the settlement, and large quantities have been carted and applied to alkali-impregnated soils.

**TOBACCO.**—Mr. Harrison tabled samples of cigars and tobacco manufactured from tobacco leaf grown from Bureau seed.

**Penola, August 21.**

Present—Messrs. D. McKay (in chair), Dr. Ockley, J. Fowler, J. W. Sandiford, J. D. Wilson, D. Balnaves, S. B. Worthington, L. W. Peake, and T. H. Artaud (Hon. Sec.).

**ILLUSTRATIONS OF PESTS.**—It was decided to ask the General Secretary whether the illustration of weeds and insect pests in the *Journal of Agriculture and Industry* could not be colored to make them more instructive. [The Bureau funds will not allow of the additional expense for this work.—GEN. SEC.]

**COWS CHOKING.**—Mr. Balnaves said a cow of his had been choked while eating potatoes, and asked what was the best treatment under similar circumstances. Dr. Ockley said they should first try to squeeze the potatoes: if that was not successful, give the cow about half a pint of oil and try to push the potato down with a rope. If this failed, make an opening in the throat, cut the windpipe cross-ways, remove the impediment, and put two stitches in the windpipe.

**Morgan, August 13.**

Present—Messrs. J. Jackman (Chairman), A. Stubing, C. F. W. Pfitzner, G. Roediger, E. Jacobs, J. Bruhn, T. T. Schell, L. Stubing, J. Brus, R. Windebank, E. French, H. Frost, A. Dennis, and J. Wishart (Hon. Sec.).

**FEED FOR STOCK.**—Members reported that native bushes and trees had been largely used for feeding to stock during the drought, bull-oak (*Casuarina* sp.) and sandalwood (*Santalum* sp.) being most largely used. Owing to the absence of feed nearly all stock had to be removed from the district to the north and north-east pastoral districts. Several members reported satisfactory growth of Cow pea, and desired to know whether it gave better results fed green to cows or allow to mature and the grain and straw used. [For cows in milk, use whilst green. For dry stock, use as hay. It can also be ploughed under as green manure.—GEN. SEC.]

**DRILLING SEED.**—Mr. Pfitzner stated he had put in 250 acres of wheat crop with the seed drill. Being virgin soil, no manure was used, and he is well satisfied of the superiority of this method of sowing over the broadcast system.

**IRRIGATION.**—Considerable discussion took place on the possibilities of irrigation by pumping from the River Murray, and from the Burra Hills by gravitation.

## ECONOMIC LEGISLATION IN THE UNITED STATES IN 1896.

WILLIAM B. SHAW, IN THE "QUARTERLY JOURNAL OF ECONOMICS."

Iowa, having tired of half-way measures in dealing with the cigarette evil, has finally placed an absolute embargo on the manufacture and sale of all cigarettes of whatever material composed. Other instances of legislative interference in private business, presumably in the interest of the general well-being, are the New Jersey law requiring all bread to be sold by weight at retail, and the South Carolina prohibition of the manufacture and sale of imitation butter and cheese except when duly marked in a way to indicate its character. Utah also provides against deception and fraud in the sale of dairy products.

After many fruitless efforts in New York to extend the provisions of the factory-inspection law so as to cover mercantile establishments, an enactment has finally been made which aims at the same or similar ends, and seems likely to accomplish some measure of the practical reforms so long sought by those who have perceived the evils to which the employment of women and children in the great "department stores" of cities is necessarily exposed. The primary object of the measure was understood to be sanitary improvement, and after considerable debate it was finally decided to put the enforcement of all the provisions in the hands of the health officials instead of in the hands of the factory inspectors, as had been originally proposed. Thus it is made the duty of the health officer to see that no child under 14 years of age is employed in any mercantile establishment; that no male under 16 and no female under 21 shall work in such an establishment at the rate of more than ten hours a day or sixty hours a week, or before 7 in the morning or after 10 in the evening (excepting during the Christmas holidays, when overtime work is permitted); that proper and convenient lavatories and toilet-rooms are provided; that the women employed have seats; that basements in which employes are required to work shall be properly lighted and ventilated; and that all employes shall be allowed forty-five minutes for a mid-day meal. In the case of each child employed, the Board of Health's certificate as to the child's age and physical ability to perform the task assigned him is requisite, and the parents or guardians must be able to show that the child has had one year of school instruction.

The new Ohio law dealing with the "sweat-shop" evil seems to leave little to be desired in the way of definite statement. In this respect it is certainly an improvement over similar laws passed during the last few years in other States. Its purpose is stated in the title to be the preservation of the public health, and its restrictions are declared to apply to all apartments occupied for "carrying on any process of making any kind of wearing apparel, or goods for male or female wear, use, or adornment, or for the manufacture of cigars, cigarettes, or tobacco goods in any form, when such wearing apparel or other goods are to be exposed for sale or to be sold by manufacturer, wholesaler, or jobber to the trade or by retail." But an exception is made as regards apartments thus used by immediate members of the family which occupies them as a domicile. All rooms so used for workshop or factory purposes must be "separate from and have no door, window, or other opening into any living or sleeping-room of any tenement or dwelling." Such factory or workshop rooms are never, under any circumstances, to be used as living or sleeping-rooms.

Beds, bedding, and cooking utensils are forbidden in them. Direct entrances from the outside are required, and each person employed in such workrooms must be provided, with 250 cubic feet of air-space by day and 400 cubic feet by night. Provision is also made for proper and necessary toilet accommodations; and under this head the law's demands are specific and seemingly incapable of misconstruction. The factory inspector is empowered to order the closing of shops and factories which fail to conform with the provisions of this law, and to arrest and prosecute delinquent proprietors or managers. Those failing to comply with the law are debarred from any contract for work, notice of their delinquency having been given by the factory inspector; and all firms and corporations giving out work are required to keep registers of those persons with whom contracts are made. Finally, all traffic in goods made in violation of the law is prohibited, and the customary penalties of fine or imprisonment are prescribed. It may be noted in this connection that all the effective statutes thus far enacted for the purpose of suppressing the "sweat-shop" evil have been based on considerations of public health solely. The Illinois Act of 1893, however, was held to be unconstitutional on the ground that its provisions concerning hours of labor interfered with the right of private contract, while it did not seem to the Court that the measure was primarily in the interest of public health.

Maryland prohibits the use of coal-oil or gasoline in "sweat-shops," and requires fire-escape equipment.

New York was the first State to place bake-shops under special sanitary regulations and to attempt a systematic restriction of the hours of labor in them. New Jersey has now passed a law very similar to that of New York, fixing the hours of labor at ten a day, or sixty a week, and prohibiting the future use of cellars or basements for bakery purposes. Ohio and Massachusetts have adopted like restrictions. New Jersey requires, hereafter, the bi-weekly payment of wages by every manufacturing, mining, quarrying, or lumbering corporation or partnership. The State factory inspector is empowered to institute judicial proceedings in case of breach of this law. The New York Legislature authorised the opening of free State employment bureaux in New York City similar to those conducted for several years in Ohio. In Utah the employment of children under 14, or of any female, in mines or smelters is absolutely forbidden. Eight hours is prescribed as the legal day's labor in mines and smelters, and this latter provision has been declared constitutional by the Utah Supreme Court. The Constitution of the State, in fact, directs the Legislature "to provide for the health and safety of employes in factories, smelters, and mines." The Court held that a limitation of the labor of miners, who must work underground in unhealthful surroundings, to eight hours a day was in strict conformity with the constitutional provision above quoted. The Utah Legislature, at this its first session, passed several other laws affecting labor in various relations. Thus the practice of "black-listing" employes is prohibited, and a penalty is imposed on the employer so offending. Provision is made for the employment of a State Board of Arbitration and Conciliation, whose duty it shall be to act on every application of employer or employé, or of both, in case of differences requiring adjustment by a third party. One of these Commissioners must be an employer of labor, the second an employé, and the third a member of neither class. Fellow servants are distinguished by statute from vice-principals. The employes in one department of service are not to be held as fellow-servants with those in another department. In all receiverships in Utah laborers' wages are preferred debts, and when successful in a suit for wages all employes are entitled to attorney's fees at public charge.

## EMPLOYERS' LIABILITY.

### THE GERMAN SYSTEM.

(LONDON "DAILY CHRONICLE.")

The third of the series of Quain law lectures delivered in the Old Hall, Lincoln's Inn, recently, by Professor Augustine Birrell, Q.C., M.P., dealt entirely with the question of employers' liability abroad. After alluding to the systems current in Sweden, Italy, Switzerland, Norway, and Holland, the lecturer said in all foreign countries there was a tendency to shift the liability to the employer in all cases of accident. He then dealt with the system in operation in Germany, the mother of this scheme. The German states had early founded a system of sick insurance, and had made it compulsory on workmen to join some society, and as early as 1838 Prussia had introduced the system into the railway industry. In 1885 the great scheme of Germany came into operation. This consisted of two sister measures, a sickness insurance and an accident insurance. In the first, the funds are contributed by workmen and masters together, the workmen providing two-thirds and the masters one-third of the club. The accident fund, which included all cases of serious or fatal injury, was supplied entirely by the employer, or rather by a corporation of the employers of each trade. This insurance was compulsory. Every man in the wage-earning class was obliged to join some authorised club and to pay a weekly sum, deducted from his wages, for which he was entitled to a certain weekly allowance, varying in proportion to his wages for thirteen weeks. Of the accidents occurring in Germany, by far the larger part were entirely provided for by this fund. Of the 310,000 accidents in 1895, no less than 234,000 were cured within the thirteen weeks, and only 76,000 came on the accident fund. This accident fund was an elaborate contrivance, and the important part which differentiates it from the present Government Bill was the fact that the liability to pay compensation to the injured man rested not on the individual employer, but on the whole trade to which the employer belonged.

Mr. Birrell, M.P., gave the last of his series of lectures on the Employers' Liability Bill on Friday. Mr. Birrell said that hitherto it had been a maxim of English law that there could be no damages without delinquency, and this question of damages done to workmen in the course of their employment had been further limited by their judicial legislators by means of the doctrines of common employment and contributory negligence. But the Bill before the House of Commons introduced a new doctrine. The parent of this doctrine was costs. Costs killed Mr. Asquith's Bill of 1893. The new doctrine which took the place of the old one was that in every contract of service there was an implied contract on the part of the employer to insure the workman against accidents arising in the course of employment, from whatever cause. The principle of the Bill was a perfectly sound one. It was not a principle of crime or of tort, but of contract. The only question of law involved was, Is it an accident, and does it arise from the negligence of the workman himself? If not, and it was an accident, then the employer was liable for compensation under a certain scale. He thought the measure might be amended in the direction of seeing that the workman was assured of his compensation, irrespective of the solvency of his employer.



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## Industry.

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### NOTES AND COMMENTS.

The weather during September has been rather too dry within the chief northern agricultural areas, and crops and herbage have come forward too rapidly. Cereals and herbage are running to seed already. Wherever possible some paddocks should be reserved, to allow the grasses to mature their seeds, so that natural regeneration of pasturage may be effected. The Lower North and South and South-East districts have little to complain of in respect to weather, and prospects of good crops and plenty of feed are very promising. It is rather too early to prophesy concerning the fruit crops, but in some of the early districts there is a good show for stone fruits.

In order that owners of small numbers of apple, pear, orange, and other trees liable to be attacked by codlin moth, orange red scale, and other pests may be enabled to deal with these pests in a cheap and effective manner, it has been decided to keep a register of jobbing gardeners who may have provided themselves with proper spraying apparatus, and have made themselves acquainted with the proper compounds and mixtures which must be used therewith. The register will be kept at the office of the Hon. the Commissioner of Public Works, and a list of qualified persons will be published monthly in the *Journal of Agriculture and Industry*. Those gardeners who may be prepared to take up this work should register their names and addresses as above.

Public opinion is much divided on the question as to whether or not spraying should be compulsory for minimising the ravages of codlin moth; but that Paris green has been positively efficient in some other countries is beyond all dispute. Failure to obtain satisfactory results in dealing with the numerous varieties of insects and fungus diseases of plants in many cases in this colony may fairly be attributed to want of knowledge of how to do the work, and which of the many spray compounds to use for the particular disease it is wished to combat. As this is a work requiring special skill and knowledge, it may be considered to be desirable to employ expert contractors in each centre to do the work. In the event of cyaniding, the tent and plant would be expensive, and their use requires skilled labor, and this would make it still more desirable to have contractors to do the work who would be provided with all plant necessary to deal with horticultural pests.

On several occasions it has been stated that the only effectual way of coping with the codlin moth pest was to pick all apples, pears, and quinces in the affected districts when much less than half grown. This would result in almost if not total eradication of the pest, as the caterpillars could not have their usual food, and would consequently be starved. Or course the codlin moth attacks stone fruits occasionally, but so far in South Australia no moths have been matured from such caterpillars, and it is believed by many careful observers that they are incapable of maturing on such food. If any such action as suggested were taken, it might be necessary to pay compensation for the fruit destroyed in unaffected orchards, and this would have to be done from money raised by levying a rate per acre on the whole of the orchards of the colony, with perhaps some assistance from the public funds. At the latest meeting of the Central Bureau Mr. Holtze gave notice that he would at the December meeting of the Central Bureau move that some scheme in the direction indicated should be formulated. In the meantime the Bureau will be glad to hear the opinions of the growers themselves on the subject, and also any suggestions as to the form of compensation, &c.

Mr. W. J. Hannaford, of Gumeracha, has made a considerable quantity of vinegar from his surplus apples this season, and has left a sample at the office of the Agricultural Bureau. It is very strong, and of a peculiarly pleasant flavor. For some purposes it would have to be reduced in strength, but for pickling and similar uses this vinegar is especially valuable. Cider vinegar is largely used in America, and is made not only from the surplus fruit, but also from the culls, and from the peels and cores resulting from the evaporating process. The process is very simple, and the prices given for really good cider vinegar so good that it appears to be more profitable to make vinegar than to produce cider. It is necessary to use only sound, ripe, and clean fruit for apple vinegar, and it is usual to wash the fruit in water before crushing. If these precautions are not adopted, the vinegar will not be of first quality. In this colony it is far more difficult to make good cider than in a country where the average temperature is cool. In hot climates fermentation is so rapid and fierce that the ferment is killed, and then there is every prospect that fresh fermentation will set in later on and spoil the liquor.

In France anyone found guilty of offering adulterated or sophisticated food, etc., for sale is heavily fined, and is, additionally, compelled to exhibit a large placard, for a year after, in a conspicuous place in his shop or warehouse, stating that he has been so convicted. Manufacturers, however, are allowed to color pickles with copper, or to treat food products with chemicals, provided these articles are exported and not offered for sale in France. In the United States of America there are severe laws against adulteration, substitution, and sophistication in respect to food stuffs, fertilisers, drugs, &c. In Nebraska the latest law provides heavy penalties where people sell or keep for sale any vinegars containing preparations of lead, copper, sulphur, or other mineral acids, or other ingredients injurious to health. Each parcel or lot of vinegar sold must have a label, stating the substance from which it is made—such as apple, grape, grain, &c.—together with the name and address of the maker. One clause of the Act provides that "All vinegar shall be made wholly from the fruit or grain from which it purports to be or is represented to be made, and shall contain no foreign substance or artificial coloring, and shall contain not less than 4 per cent. by weight of absolute acetic acid."

Jordan almonds and some other varieties often fail to give satisfactory returns. This may sometimes be attributable to unsuitable conditions of soil, situation, or climatic conditions; but where all things are favorable, and still the trees fail to yield crops of nuts, it is highly probable that absence of pollination is chargeable with the barrenness of the trees. Mr. H. Wicks, Payneham, has in his nursery a row of almond trees which bear good crops of nuts every season. In this case everything is favorable for the trees—as in many gardens near by where poor crops are produced on Brandis trees—and he is convinced that his good results are due to the fact that only each alternate tree is a Brandis, whilst the intervening trees belong to other varieties, and these cross-pollinate each other, as is the case with varieties of apples, pears, and other fruits.

Mr. Chas. Pitt, of Felixstow, left at the office of the Central Bureau on September 10th a few Daira or Almeira grapes, which had been cut and packed in cork dust on May 1st, and kept at an average temperature of 52° F. The twigs and stems were as dry as could be, but the berries were only slightly shrivelled, and were as good in flavor as could be expected in this variety. Grapes from the same vines, similarly packed, and sent to London, were reported to be worthless. Mr. Pitt also left at the same time and place some oranges, which were wrapped and packed on July 8th, and these were in splendid condition.

Maize, sorghum, and similar sub-tropical plants should not be sown too early. They require a good high temperature to develop the young plants, which, if checked by cold, will remain stunted. The seeds should be specially selected, because they are very liable to vary from the true character. Maize, sorghums, and millet are particularly liable to cross-fertilisation. The seeds should never be buried more than 2in. If buried deeper the plants will be delayed in coming through, and then will be compelled to produce “adventitious” or secondary roots nearer to the surface, where air, moisture, and nutriment can be obtained. Such crops should be frequently cultivated, so that the surface may always be loose and open to admission of air; but this loosening must not be deeper than 2in., and the soil must be well pulverised, else more harm than good will result.

Substitution of one article in place of another purchased by a customer, even though the article substituted may be superior, and of much greater value, is unjust. Adulteration and sophistication are fraudulent, and equally deserving of punishment with petty theft. Commercial morality in many matters has become lowered during the past century, owing to keen competition. Directly a demand is created for any manufacture there will arise some imitator who will produce something like it, but cheaper, and upon this another will come forward with something cheaper still—in each case the cheapening is brought about by the substitution of something inferior in the manufacture. For instance, coffee is adulterated with chicory, and chicory is substituted by the waste from beet sugar manufacture. Vinegar is a wholesome product from fruit or grain, and contains vegetable acids distinctly beneficial; but although true vinegar can be made very cheaply, there are mineral and chemical acids that can be diluted with water and colored with burnt sugar, which can be sold at a tithe of the cost of true vinegar, and the health of the consumers consequently suffers.

"Wood wool" is a material which has recently come into use for packing purposes, and is rather largely utilised already by shippers of delicate fruits. Fir and aspen are amongst the best varieties, being soft, elastic, odorless, and of an agreeable clean color. The wood is shredded into long shavings of extreme thinness. Mr. E. Burney Young has sent a small quantity to the Produce Export Department, where samples of four qualities can be seen. It is intended to use this experimentally during the coming season for packing grapes, apples, and pears for transit to the London market.

Stack ensilage should be made during this or the next month, when the plants are in bloom. Any nutritious plant will do—the greater the variety the better the food. Mow the fodder one day, make into windrows in the afternoon, and cart into the stack the next day, commencing to cart from that portion which was first cut. The herbage should lie flat for three or four hours before being put up in windrows. Temperature in the stack will rise to 125° or perhaps to 135°, but by adding fresh stuff on top it will be reduced. When the whole has been stacked, let stand twenty-four hours, then rake down loose stuff on sides, top up on the stack, and put on good heavy pressure or weight on top.

The "soursops" (*Oxalis cernua*) is very difficult to exterminate, and is undoubtedly a "noxious weed," although not "within the meaning of the Act." The most effective means of eradication is to enclose the affected spot, and to put in a herd of pigs, which will root out every particle of the weed in time. Another remedy is to cover the weeds with a thick mass of litter, which will prevent the leaves getting any light, or to cover closely with bags or anything that will smother the plant. By constantly cutting off the leaves directly they appear the plant will be starved out by the end of three years.

Wild mustard, or "Charlock," has been introduced into many of our wheat and hay fields. It is undoubtedly a pest in such localities, and every effort should be made to prevent its introduction to fresh fields (by thoroughly cleansing all seed before sowing), and to eradicate it from fields already infested. It is reported that a solution of 5lbs. of sulphate of copper in 100galls. of water will destroy the weed when about to flower, and will not injure the cereal plants. However this may be, the charlock should be pulled up and carried off the field before it breaks into flower.

During this month and the next, efforts should be made to diminish the number of English sparrows. The young birds can be readily trapped by trap cages, and young and old birds poisoned. Eggs and young should be removed from nests, but leave the nests alone.

## AGRICULTURAL SOCIETIES.

### DATES OF SHOWS.

Belalie, October 13; Colton, October 27; Kudina, October 6; Kingston, October 21; Lucindale, November 3; Maitland, October 20; Millicent, October 27 and 28; Minlaton, October 27; Moonta, October 13; Mount Gambier, October 20 and 21; Mount Pleasant, March 18; Orroroo, November 3; Petersburg, October 27; Robe, October 14 and 15; Stanley, November 4; Southern, November 11; Strathalbyn, October 7; Tatiara, October 29; Virginia and Port Gawler, October 7; Woorora, October 13; Yankalilla, Myponga, and Rapid Bay, November 5.

## NOXIOUS WEEDS.

[NOTE.—The illustrative blocks of *Centaurea solstitialis* and *Centaurea calcitrapa* have been kindly loaned by the New Zealand Department of Agriculture.—EDITOR, *Journal of Agriculture and Industry*.]



**CENTAUREA SOLSTITIALIS (YELLOW STAR THISTLE).**—This is also called St. Barnaby's Thistle. It is not as tall or strong as the *C. calcitrapa*. It is upright and lightly branched. The upper or stem-leaves are not divided, but the lower leaves are divided. The spines on the flower-head are flattened, with short prickles on each edge and a longer one on the end, all of a reddish color. This is also an annual, and in many respects like *C. calcitrapa*.

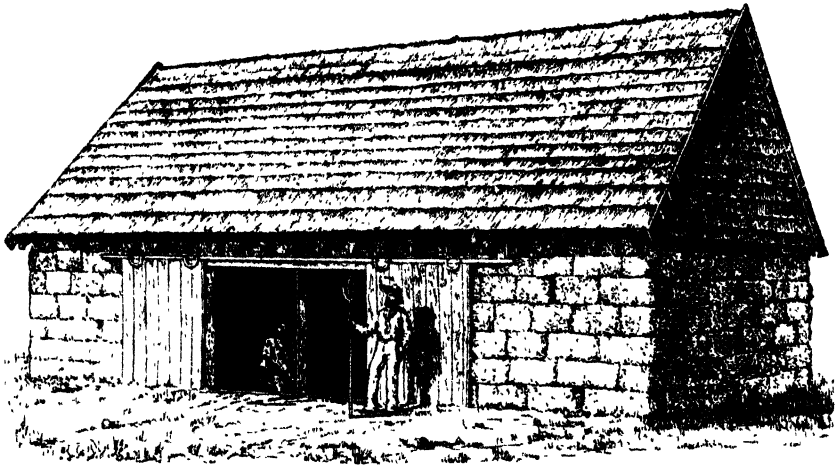


**CENTAUREA CALCITRAPA (STAR THISTLE).**—The name “Star Thistle” applies equally to all members of the *Centaurea* genus, but has been adopted in Australasia for the particular species, *C. calcitrapa*. The drawing was made by the late Baron F. von Muller, and is very correct in its details. The name, “*calcitrapa*” is derived from a supposed resemblance of the flower-head to the calcitrop (a metal ball with sharp spikes inserted in such a way that one point was always on top), used by the Roman soldiers to throw in the way of cavalry horses when charging. The spines of the Star thistle are long, strong, sharp, and bone-white, and the flower is purple-pink. When young, the plant is somewhat dense, and dark sage-green, and takes possession of the land, especially for a year or two after a cereal crop has been cultivated. When full-grown the leaves are lighter green in colour and partially divided. Cross-bred sheep will eat the young plants when there is little else for them; but when it begins to flower it is from 18in. to 30in. high, much branched, and too

harsh and prickly for any animal, and very few animals care to walk across a field of star thistle when in flower. Being a summer annual, it can be destroyed by ploughing under in late spring, when the condition of the soil will allow; but it is often the case that the ground is too hard and dry at this time, and if allowed to go to seed, the seeds are carried over the country by the wind. The presence of this weed, or of its near relative *C. solstitialis*, will greatly diminish the value of land, and decrease the yield of any crop sown upon it.

## BUILDINGS OF BALED STRAW.

In some parts of the American States—Kansas, for instance—it has long been the practice to build barns and other farm erections with blocks of baled straw, which are found to be durable, economical, and very convenient for housing all kinds of livestock, as well as for sheltering implements, tools, and machinery. The illustration, copied from "Report of the Secretary of Agriculture for 1892, Washington, U.S.A.," shows one of very many such erections in Kansas, described by Dr. J. A. Sewell, Superintendent of the Grass Experiment Station at Garden City, Kansas—



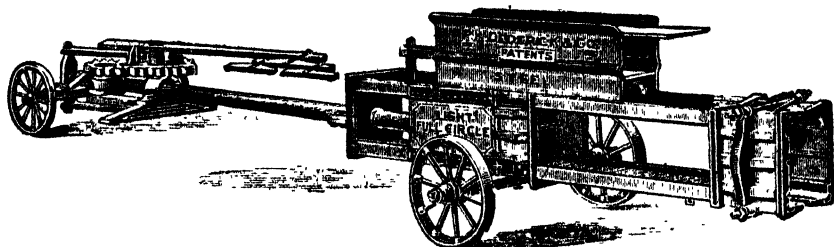
The bales are pressed by means of a continuous baling press. These may be of any size, but for convenience are best when made 22in. x 17in. x 36in. long. They are usually bound with two bands of No. 10 steel wire, but may have more bands. The presses are worked by one horse changed each day, or by two light horses, or other presses can be worked by steam. Ten hours' work, with two men and a boy to drive the horse, will bale a ton to a ton and a half of straw, at a cost of 10s. to 12s. per ton.

The first thing is to bale sufficient straw for the building, then level the ground. If possible raise a slight bank to keep the bottom layers of bales always dry. Have a lot of dowels made of hardwood, 8in. to 10in. long, sharpened at each end, and 1in. in diameter. Put down sufficient bales to form the foundation, leaving spaces for doorways. Before putting on second course or layer of bales, stick two dowels half their length into each bale on top near the ends—say 8in. from each end—to prevent slipping, and be careful to "break the joints" in each course, just as bricklayers do with courses of bricks. Leave apertures for windows or lights, and place planks to carry the courses

above them. When the walls are high enough, lay on planks or wall-plates to carry rafters or tie-beams, and then thatch, or cover with galvanized iron in the usual way. Some farmers use four dowels to each bale—one near each corner—which makes a better job.

In the Goulbourn Valley, Victoria, Mr. Alexander Thompson two or three years since, erected a straw barn 46ft. x 25ft. x 10ft high, with 315 bales of straw, 22in. x 17in. x 36in., at a cost of £10, and his example has been followed by several other farmers. The cost of baling was about 10s. per ton, and about 12 tons of straw were used, the weight of each bale being from 80lbs. to 90lbs.

The following illustration of P. K. Dederick & Co.'s (Albany, N.Y., U.S.A.) light full circle iron and steel continuous baling press will give some idea of the class of machines used for this purpose.



Messrs. Clutterbuck Bros, 67, Hindley-street, Adelaide, have several times exhibited these continuous baling presses at the Royal Agricultural shows as well as in the country districts, and have kindly furnished the following particulars:—The Dederick continuous baling press is made in several sizes and patterns, in wood and in iron and steel. Some patterns are for working with horsepower, others are driven by steam. The latest improved forms are provided with mechanical feeders, which save a deal of labor. The sizes of bales made are 14in. x 18in., and 17in. x 22in., and as long as required. The quantity that can be pressed per hour depends upon the power used and accessibility of the loose straw or hay. With horsepower about 10 to 15 could be baled within nine hours; with steam 15 tons to 20 tons could be turned out. The length of each bale can be regulated by the man who attends to the wiring, and may weigh from 80lbs. to 200lbs. or more. Two men are required, but three will do more work than two, and a boy is wanted to drive the horse. One horse can work the press, but it should be changed once each day. The steel machine, with horseworks attached, can be supplied ready to work for £125; the horse works cannot be separated from the machine. A steel continuous baling press for steam can be supplied for £175.

Unless a farmer is in the habit of baling a good deal of hay every year, he would probably hesitate to lay out £125 on a press; but members of any Branch of the Agricultural Bureau, or any dozen of farmers could, with much advantage, purchase one by uniting their funds; and a moderate charge upon each ton of hay or straw baled would very soon recoup the original purchasers.

Baled straw could be used in construction of barns or enclosures for "cocky chaff," and for surface silos. These structures when filled need not be roofed, but could be topped with either loose or baled straw, and then be thatched over as haystacks are thatched or covered with Willesden, or similar roofing felt. Another use that could be made of pressed straw bales, would be in place of mechanical pressure or weighting of silo pits and stacks, with the further advantage that the straw can be used at any time, when droughts occur, as food for the live stock. Pressed straw or hay would not readily burn, so



that danger from stacks being destroyed by fire would be reduced. Where bleak winds are prevalent, any farmer could in time provide perfect shelter for his orchard, garden, dwelling, live stock, &c., by saving and baling the whole of his straw, and, having thus provided a certain supply of fodder, he would be justified in maintaining a much larger number of live stock on his farm. In good seasons his stock would eat up the herbage on the fields; and in bad seasons they could be largely fed on the baled straw, made more palatable and nutritious by the addition of molasses and salt.

## CARE OF FARM IMPLEMENTS.

Shelter, oil, and paint properly used at the right time will save a deal of useless expenditure on new implements, &c., and prevent a lot of worry and delay in getting repairs made at a time when the implements ought to be at work instead of in the repair shop.

Shelter alone will save a certain amount for paint and oil, and will maintain the strength and effectiveness of the machine or implement, or what not, for a very long period; whereas, if left exposed to all weathers, the machines, &c., will very quickly become rusty, cracked, perished, and useless.

With the protection afforded by paint and oil, such articles will even withstand exposure for a certain time, although it would be very foolish to trust to paint and oil, because shelter will make a saving of wear and tear upon those two preservatives additionally. Paint will protect all wood and iron from effects of wet, damp, and rust, but in the working parts, as well as on nuts and screws, it is necessary to use oil or grease, free from salt and corrosive acids. Lard, oil, or pure mutton suet melted and mixed with some kerosine—about one-third kerosine to two-thirds suet—are useful for this purpose. For journals and bearings a teaspoonful of pulverised black lead to each quart of the lubricant may be used. Cog wheels should only be rubbed with black lead. Do not smother them with grease, which only collects sand and grit, and this soon grinds away the cogs, so that the wheels jump, and in the end the cogs break.

Belts, chains, and canvas on binders should not be strained tighter than is just necessary to make them run without slipping; otherwise it will strain the entire machinery. Watch the weather in regard to canvas, as it will shrink with damp air, and make it too tight for the welfare of the machine.

Tarpaulins should always be handy on the field, to cover binders, winnowers, or other machinery and implements when not in use—even at lunch-time, or when a shower comes on.

If a nut will persist in working loose, screw it up, and tie a piece of worsted dipped in brine around the thread above the nut—this will rust it on and make it fast. All spring keys should be kept well spread, and the mower knives must be kept sharp—if blunt they will work heavily as well as badly.

It is much cheaper to grind and mix your own paints than to purchase them ready made. Use enough boiled linseed oil to make it of the nature of thin putty, add as much turpentine as will increase the quantity by one-half more, and to this put a good large thimbleful of best dryer for each pint of paint. If not quite thin enough to spread well, add a little more linseed oil.

Paint all wood-work of implements, &c., at least every second year. Brown, black, green, blue, or yellow colors are best, but red is objectionable on account of its effect upon the eyes. The woodwork of the binder should be done over with varnish, and kept always in the shed when not in use.

It is important to prevent the fowls roosting on machinery and implements, especially those constructed wholly or partly of wood.

Paint brushes should be put into a vessel of water over night whilst in use,

and when done with should be washed out with benzine, gasoline, or kerosine, and then hung up.

Before putting away the binder or any other implement in the shed, clean it well, and oil every working part and bearing, and about four months after, in the case of harvesting machinery, oil all the parts again. Hang the canvasses across a wire so that rats and mice cannot get at them. Tie an oiled rag over the knotter to prevent rust. See that all repairs to implements are done before putting them in the sheds. It is too late when taken out to go into the field. Linseed oil and whiting on the bright parts will keep iron and steel from rusting.

A few days before taking out the binder, oil every cup, bearing, and spindle, also the whole of the knife, to remove gum, and oil also all bearings in other machinery. This will make every part work easily, save the strength of the animals in working, and prevent unnecessary straining in every part of the implements.

## INFLUENZA IN HORSES.

BY E. STANLEY, F.R.C.V.S.

*Character.*—It is a contagious equine fever, due to germinal matter invading the system, producing disastrous changes in the blood, which interfere with nutrition, excite congestion, and occasionally inflammation of important organs or tissues. The germs of this disease are always lurking about, and epidemics are due to exceptional climatic changes that have a lowering effect on the health of horses, and at the same time favor the vitality of the disease germs. The worse cases are amongst hard-working horses in overcrowded sheds, with bad sanitary surroundings; next come fat horses; and the least susceptible are horses that are in good working condition, cleanly kept, and well cared for. If such have the disease at all, it is in a mild form, and they speedily recover.

*Symptoms.*—In the onset, loss of appetite, drowsy headache, pain in the limbs, general weakness; in many cases the eyelids are swollen, tears trickle down the face; there may be discharge from the nostrils, and occasionally coughing; the eye will be found scarlet and orange color, the tongue furred, breath offensive, the heart beats feebly but quick, the pulse is small and weak, the dung is soft, and the urine high-colored; there is a general rise of the bodily temperature. As the disease progresses the symptoms will depend on its course, which is very variable, as the numerous names given to the disease indicate. The vital forces in many cases overcome the toxic effects and excrete the poison from the system. It is to assist this process that we have recourse to treatment.

*Treatment.*—This should consist of rest, pure air, shelter from sun, rain, or wind, bran mash, and cut green food, with drachm doses of chlorate of potash, carbonate of ammonia, or nitrate of potash, given in the drinking water. If the case has been taken early enough, and the surroundings are good, the fever will abate, and recovery be complete in a very few days. Unfortunately many horses are worked at the commencement of the illness, then they are completely knocked up, and they present a variety of bad symptoms, owing to the mischief being located in individual organs, such as those of respiration, or the bowels, liver, spleen, lymphatic glands, or cerebro-spinal system. The location can only be diagnosed by the educated veterinarian, and every case should be treated to suit the nature and stage of the illness. Dropsical swellings are a favorable indication, but time and patience must be allowed for recovery. No case is cured until the horse is playful at exercise.—*Annual Report New South Wales Stock and Brands Department.*

## AGRICULTURAL BUREAU CONGRESS.

The Ninth Annual Congress of the Agricultural Bureau of South Australia was held in Adelaide on Wednesday, Thursday, and Friday, September 8th, 9th, and 10th respectively. Mr. F. E. H. W. Krichauff, Chairman of the Central Bureau, presided.

The following members of the Bureau attended one or more of the sessions :—Central: Messrs. F. E. W. Krichauff (chairman), Samuel Goode, W. C. Grasby, M. Holtze, Thos. Hardy, Professor W. Lowrie, H. Kelly, J. Miller, M.P., T. Price, M.P., T. B. Robson, W. F. Snow, Hon. A. W. Sandford, M.L.C., C. J. Valentine, and A. Molineux (secretary). Angaston: Messrs. W. Sage and F. Salter. Arthurton: Mr. W. H. Hawke. Baroota Whim: Messrs. A. J. Dixon and F. H. Plugge. Burra: Messrs. J. Lewis and F. A. Field. Belair: Mr. G. F. Laffer. Carrieton: Messrs. M. Manning and N. Travers. Cherry Gardens: Messrs. J. Potter, C. Ricks, and R. Gibbins. Clarendon: Messrs. A. Harper, A. L. Morphett, and J. Piggott. Crystal Brook: Messrs. G. Davidson and W. Morrish, jun. Dawson: Mr. S. Collins. Finniess: Mr. W. W. Heath. Forest Range: Messrs. R. M. Hackett and J. Vickers. Gawler River: Messrs. J. Badman, A. Bray, A. M. Dawkins, A. Hatcher, and H. Roediger. Gladstone: Messrs. J. Brayley and C. A. Gallasch. Gumeracha: Messrs. W. Cornish, W. Green, W. J. Hannaford, S. Hannaford, G. F. Nepean-Smith, W. R. Randell, M.P., and Dr. Stevens. Hahndorf: Mr. F. H. Sonnemann. Hawker: Mr. J. Smith. Kanmantoo: Mr. W. G. Mills. Kapunda: Mr. J. A. Schultz. Maitland: Messrs. C. F. G. Heinrich and J. W. Shannon, M.P. Meadows: Messrs. W. Pearson, W. J. Stone, and W. A. Sunman. Millicent: Messrs. E. J. Harris and W. Whennen. Minlaton: Messrs. W. Correll, H. Boundy, J. H. Ford, and J. McKenzie. Mount Bryan East: Mr. T. Best. Mount Compass: Mr. H. McKinlay. Mount Gambier: Messrs. Thos. Edwards, J. C. Ruwoldt, J. Umpherston, J. Watson, M. C. Wilson. Mount Pleasant: Messrs. H. Giles, J. A. Naismith, and G. Phillis. Mundoorra: Mr. H. M. Smith. Murray Bridge: Mr. W. Lehmann. Mylor: Mr. W. H. Hughes. Nantawarra: Messrs. C. Belling, J. W. Dall, T. Dixon, A. L. Greenshields, T. Nicholls, and E. Pridham. Norton's Summit: Messrs. J. Jennings, J. Jennings, jun., and W. Merchant. Naracoorte: Mr. L. McInnes. Penola: Mr. E. A. Stoncy. Petersburg: Mr. W. Miller. Port Broughton: Mr. H. H. Whittle. Port Elliot: Messrs. J. Brown, F. T. Fisher, and C. H. Hussey. Port Germein: Mr. W. Head. Port Pirie: Messrs. F. R. Humphris and J. Lawrie. Riverton: Messrs. M. Badman and D. Kirk. Stansbury: Mr. Alex. Anderson. Stockport: Messrs. J. Murray, C. W. Smith, and D. G. Stribling. Strathalbyn: Messrs. W. J. Tucker and W. Watt. Tatiara: Mr. Thos. Stanton. Tanunda: Mr. A. B. Robin. Woolundunga: Messrs. J. H. Michael and J. Prosser. Yankalilla: Mr. G. Newbold. Yorketown: Mr. J. Davey.

### The Opening Address.

The COMMISSIONER OF CROWN LANDS (the Hon. L. O'Loughlin, M.P.), in rising to deliver the opening address, was received with applause. He said:—Mr. Chairman and Gentlemen—I regret very much that my colleague, the Hon. Dr. Cockburn, cannot be here this morning to address you. The Agricultural Bureau, you know, comes within his Department, and you know also the great interest that the Honorable the Minister takes in forwarding your work in every possible way. The Minister of Agriculture is attending the Federal Convention in Sydney, and I have to take his place here to-day. Still,

many of you are aware that I have been engaged in agricultural pursuits pretty well all my life, and anything that will tend to the development of the agricultural and other industries of South Australia always has my heartiest support. I could only wish that the opening address this morning had been entrusted to abler hands than mine. I congratulate you and the colony generally upon the change of seasons that we may now look forward to. No one knows better than the gentlemen I see before me that South Australia during the last few years has suffered from intense droughts, as well as bad prices and other misfortunes. But I think we may reasonably now look forward to a few good years, and to a decided change in the prices of our produce all round. (Applause.) I desire to refer particularly to the great usefulness of the Agricultural Bureau to the agriculturists, gardeners, and others of South Australia. There are, I understand, in various parts of this colony, about a hundred branches of the Bureau, comprising some 1,400 members, most of whom work hard to assist in disseminating knowledge amongst their fellow farmers and colonists. Too much cannot be said in praise of men who will leave their avocations and their homes on Saturday and other evenings for the purpose of conferring with each other in order to gain knowledge and spread it for the benefit of their fellow men. Since the establishment of the Bureau important developments have taken place in many of the industries in South Australia. It is since the inauguration of the Bureau that we started co-operative butter factories, and many other things, such as the prevention and eradication of diseases in fruit, have followed the advent of the Agricultural Bureau throughout the length and breadth of the land. (Hear, hear.) The Bureau and the Branches are at all times anxious to discover any new variety of plant, whether for fodder or fruit and to spread their knowledge amongst the people. I expect, too, that the Bureau has had a great deal to do with the advent of the seed drills and fertilisers. (Applause.) I look upon the introduction of the seed drill and the use of manure with a great deal of hope. As old agriculturists you know that the time has gone by for only ploughing the land and sowing the crop, for some of our wheat land has been under cultivation for forty or fifty years, and has been bled to death pretty well; and unless we go in for manuring it the land will go out of cropping altogether. The introduction of the seed drill and fertilisers will give us new hope. From the results already obtained it is fair to expect that we will get twice the crop, or more, than we have been having, and instead of worrying to get in a large area of wheat to meet your liabilities, you can put in half or two-thirds of the amount, and then obtain a far greater return than before. I am glad to be able to tell you that even now it is estimated that between 50,000 and 60,000 acres have been put in by the seed drill this year; this is bound to be a success. It has been so in the past, every year, and it is fair to assume that five or six times or ten times the area will be treated with the seed drill and fertilisers next year, and the area will no doubt increase as the years go by. Too much importance cannot be given to this subject in the Lower North, the South-East, and other parts of the colony that have a good rainfall. (Hear, hear.) I feel sure that the seed drill and manuring will be taken up without any fear, but that the results will be satisfactory. The Agricultural Bureau has also had a great deal to do with the improvement of stock. Previous to the bad seasons that we have recently encountered the Branches in some of the districts went to considerable trouble and expense to get well-bred bulls, and to have them distributed in various centres, with the idea of spreading the breed over the colony. The bad seasons have knocked out some of the results. However, the Government recognise that they ought to help you in this direction, and for that reason you will be glad to know that the Minister of Agriculture has given this subject a good deal of thought, and he

has come to the conclusion that, in order to assist the producers in a practical way, he should import a few bulls every year. (Applause.) This year he has had an expert buyer (Mr. Murray, of Mount Crawford), who went to Melbourne, and has succeeded in getting eight nice bulls, which will be sent to various parts of the colony. This system the Minister intends to follow up every year by getting a similar or perhaps a greater number of animals, as the fund will allow. By this means the Honorable the Minister hopes that in a few years to come there will be a better breed of dairy cattle all over South Australia. (Applause.) I do not want to go into the question of how these animals are to be distributed. That will be for the Bureau and the Minister to arrange amongst yourselves. My own notion is that they ought to be distributed pretty fairly over the colony, perhaps more to the drought-stricken districts, where they have practically lost more by their stock than elsewhere. These districts want all the help we can give them. Unfortunately many of the settlers have lost every head of stock they had. Farmers and their families, instead of having milk and butter, have had to live for some time past on bread and treacle, and bread and jam, and other things. I do not say that the introduction of these few bulls will give them milk right away—(laughter)—but I do say that if they get a few good dairy cows and a few bulls amongst them they will have in a few years a breed of cattle of which South Australia may well be proud. (Applause.) While the drought that we have so recently experienced has knocked us back a few years, it ought also to teach us a valuable lesson. We have had many lessons in South Australia; we have had many droughts. I say, and my fellow farmers say, I have no doubt, I will never be caught like this again. I will have all the hay stacks, straw stacks, and ensilage I can. For a few years the farmer husbands his straw, but after a while—perhaps four or five years after the drought—he does not husband his straw; he forgets the drought, and the result is that the drought comes when he is not prepared to meet it. He is caught napping again. (Laughter.) If we experienced a drought every other year we would doubtless be prepared to meet it. (Laughter.) Now I believe the recent drought will be a lasting lesson to us. With the improved systems of husbanding the straw, with the twine-binder, and with the seed drills and fertilisers I spoke of, we will have better crops and be able to conduct our operations cheaper; and, moreover, we will be in a much better position to meet the droughts when they come upon us. (Applause.) I am sure that I am only echoing the sentiments of everyone, and certainly of every farmer, in South Australia when I say that for the future we will recognise the wisdom of saving a straw stack every year, and of saving the cocky chaff from year to year, and not burn it, as we have been doing. I think that the days have gone by when stubble should be burned. (Hear, hear.) I think that our stubble ought to be husbanded. This year straw was fetching £2 and £3 per ton in the North, and could not be got for that in some places. I do hope that the farmers will never be in that predicament again. (Hear, hear.) With the increase of the sphere of usefulness and the progress of the Agricultural Bureau, it has been found necessary to start the *Journal of Agriculture*. I suppose most of you have seen this paper. It is cheap, is full of useful knowledge, and will be issued every month. I hope it will be the means of distributing to the various centres the results of your deliberations and observations in the numerous Branches, and I have no doubt that the *Journal* will result in much good to the colony generally. (Applause.) Of course you have all heard a great deal about our export of produce. The export of produce was extending very rapidly until the last two bad seasons. But I am sorry to say that, as the result of the severe drought and the great scarcity of lambs, butter, and other produce, this export department is not as flourishing as it might be. However,

with better prospects ahead, and with improved facilities for export, I think we will commence again to export very largely. It is only by sending away the very best kinds of butter, fruit, meat, and other articles that good and profitable markets can be found, and I am sure that the Bureau will be able to do a great deal to assist in growing the very best kinds of produce for export. You have heard a great deal too about the codlin moth question lately. A great many people condemn the action of the Government in trying to enforce the regulations with regard to the codlin moth. Well it is the duty of the Government to see that the clean districts—districts free of the pest—are protected.

DELEGATES—Hear, hear.

The COMMISSIONER: It is only by keeping a vigilant eye on the infested districts that the spread of this disease can be stopped. While we do not wish to harass those who are unfortunate enough to have codlin moth in their gardens, we must, in the interests of the public and in the interests of those who have clean orchards, see that this pest does not spread any further than we can help. (Hear, hear.) There is a difference of opinion as to whether it can be stopped or not, but I am confident that the members of the Bureau will give the Government every assistance in their power to prevent the spread of the pest. I need not therefore say anything more on that subject, for I am sure you will all feel as interested as the Government do in preventing and eradicating diseases of all kinds. (Applause.) I should like to refer in a few words to the good effect the Central Bureau and the Branches have had in spreading information to their fellow colonists. I have long felt that the members of the Bureau deserve the greatest credit for the patriotic and energetic way in which they have worked, without fee or reward, from year to year to give useful information to their fellow people.

The GENERAL SECRETARY: Hear, hear.

The COMMISSIONER: It may be said that they are benefiting themselves by doing so, but when you think that, after all, but few people will take an interest in this way in giving the information they gain to the rest of the community, you must admit that those so engaged deserve every credit from the public generally. (Applause.) We are especially indebted to Mr. Molineux, the very energetic General Secretary, who has at all times done his level best to promote the welfare of the agriculturists, farmers, gardeners, and others in South Australia. (Applause.) I have to invite you all and your friends to visit the Agricultural College at Roseworthy next Monday. At the college you will see the useful work done by Professor Lowrie, the Principal of the institution, and those under him. We owe a very great deal to the Roseworthy College. It was there they first started, I think, the introduction of the artificial manures, and demonstrated to the farmers the great good that resulted from the use of those manures. I know that a great deal has been done by private enterprise, especially on Yorke's Peninsula, and leading farmers there deserve much credit for what they have accomplished, not only for themselves, but as regards imparting knowledge to others. Professor Lowrie has had this important subject at heart from the time he entered the colony. At one time it was thought that the land in South Australia was too dry for manuring, but we have found that, with the aid of artificial manures, we can work the land with great success. I invite you all to go to the office of the Minister of Agriculture and Education and get tickets for the trip to the College on Monday. I am sure that you will all agree with me in the hope that the season will continue as good as it has been so far. Unfortunately there are still a few places in South Australia suffering from the drought. I am very glad that there are only a few, but generally the outlook is exceedingly good. I do not remember any season that promises so favorably for a fair return as the present one. (Hear, hear.)

And we may also reasonably look forward to receiving better prices for our produce. The days of selling wheat at 1s. 6d., 2s., and 2s. 6d. a bushel have gone by, I trust. With the advent of better prices and with the almost certainty of better seasons—for after bad years we can generally depend upon good years—I think that the outlook for the agriculturists and gardeners generally is very favorable indeed. What little as a Government we can do to assist you we intend to do. (Applause.) We are told that we are entirely a producer's Government. Well, I do not know that that is a very bad name after all, for I recognise—and so does every member of the Government—that in helping the producers we help every member of the community. (Applause.) It is only by fostering and developing our various industries that we can find work for the workers, and that we can find means to use the energy of those who labor in other directions, so that no matter who the producer is—the pastoralist, the agriculturist, the gardener, or anyone else—if we help him we are assisting South Australia altogether and helping everybody. I thank you, gentlemen, for the kind and patient way in which you have listened to me. I only wish I was better posted in Agricultural Bureau matters. If the Honorable the Minister of Agriculture were here he would have given you a stirring and eloquent address. (Loud applause.)

Mr. W. F. SNOW (Central Bureau): I have very great pleasure in proposing a vote of thanks to the Honorable the Commissioner of Crown Lands for the most interesting address he has delivered to us this morning. The apology with which he concluded his address was hardly needed, because I consider that the Commissioner has given us most interesting facts, and certainly a nice budget of good news, especially with regard to the magnificent importations of those eight Jersey bulls for the development of the dairy industry. I think we can all say that we have greatly appreciated the address of the Honorable the Commissioner. (Applause.)

Mr. HENRY KELLY (Central Bureau): All farmers will congratulate the Commissioner upon his splendid practical address to us. The Commissioner has known what is a farmer's life, and we look upon him as one of ourselves. The address he has given us to-day is one we can fully appreciate. We have as members of the Bureau those who are not farmers. We have Mr. Price, the member for Sturt, who is sitting by my side, and he will no doubt prove a valuable member of the Bureau. We have all doubtless great confidence in Professor Lowrie at the Agricultural College, and on Monday the Commissioner's invitation will no doubt be largely availed of. I have great pleasure in seconding the proposition.

Mr. W. CORNISH (Gumeracha Branch): I have very great pleasure in supporting the vote of thanks to the honorable gentleman for his able and practical address to-day. We may well congratulate the Government upon the steps they are taking to introduce bulls, and we hope they will be obtained from a good strain of milk-giving cows. It is certainly necessary to improve our stock in South Australia. I have long advocated the use of the seed drills. I believe that we have now in the colony suitable drills, and that we are going to reap very great advantages, as, while we cannot increase the quantity of agricultural land, we can materially increase the quantity of produce to be obtained by the use of drills, and that with the application of these fertilisers we shall see bright and healthy fields of corn where we have in the past seen wheat dying and sickly. Every year we could take from the same land additional crops, and still continue cropping instead of impoverishing the soil. On account of the introduction of the seed drill we have to think of the manures and the price to be paid. (Hear. hear.) By the circular that has been issued by the Agricultural Department we see the price at which Thomas phosphate can be obtained in the English market, and we know the difference there is between

that and what we have to pay here. The Government say they wish to help the producers of the colony, and they can do nothing better than that. (Applause.) But if we wish to see agricultural interests prosper something should be done to cheapen the prices of manures, that is to say, the Government should take steps to introduce into the colony manures at a less cost than we have to pay now. If the demand increases the price might possibly increase too. With regard to the codlin moth, if the regulations that the Government desire to enforce are strictly carried out a great hardship will be inflicted on some people. The codlin moth is found in localities where hawkers travel. The pest was carried into our district of Gumeracha through hawkers bringing their fruit boxes into the neighborhood. The townships visited by the hawkers have the pest destroying the fruit, but the townships where the hawkers have not been are clean. There is a difficulty as regards enforcing the regulations. Whilst the Branch Bureaus are with the Government in their desire to prevent the spread of the codlin moth and to see it eradicated, they recognise that it would be a hardship in many cases to enforce the regulations. I am sure we shall all profit by the address of the Commissioner of Crown Lands. I only hope that the scheme with regard to the introduction of the bulls will be carried out, and that the importations will be the means of improving the stock in the colony, for there is indeed much need of improving our herds. (Applause.)

Mr THOMAS HARDY (Central Bureau): I would like to say a few words concerning a subject that has not been mentioned this morning. The vine-growing industry is under the great risk of being endangered by the introduction of phylloxera. A Bill is now before Parliament providing for an insurance fund, so that if the phylloxera does come here we may be able to tackle it quickly and effectively. I am sorry to see that a good deal of opposition towards the measure is being manifested in some districts, but I think that that opposition has arisen chiefly through a lack of knowledge of the nature and scope of the Bill.

Mr W. C. GRASBY (Central Bureau): Altogether.

Mr. HARDY: I think the people are impatient of taxation in any form, and I do not wonder at it, especially when the price of crops and wine is so very low. But at the same time we are hoping that these bad times will not continue. I do not think that they will continue; but I do not consider we should be prevented because of that from trying to prepare ourselves for the advent of phylloxera, which will undoubtedly come sooner or later.

DELEGATES: Hear, hear:

Mr. HARDY: We have been able to keep clear of it so far, since it first appeared in Australia twenty years or so ago, and possibly we may keep clear of it another twenty years; but there is no certainty about it. We may have the phylloxera in our vineyards at any moment. I do hope the Government will do their utmost to get the Bill passed. I trust that the opposition, which I feel must be owing to ignorance of the scope and provisions of the Bill, will disappear, and that the measure, either in its present form or amended, will become law during the present session. I have very great pleasure in supporting the vote of thanks. (Applause.)

Mr. J. SMITH (Hawker): I very heartily support the vote of thanks to the Commissioner, who has given us a very practical address. I trust that when these bulls are brought into the colony we shall have some of them up our way. (Laughter.) Perhaps the department would not mind sending along a few cows as well. (Laughter.) You know how we have been suffering in the North. Our stock are almost gone. There are a few in the district. Now is the time to improve the breed, and in our district we shall be very pleased to accept a bull and a cow at any time. (Laughter.)

The motion was passed with acclamation.



The COMMISSIONER OF CROWN LANDS : Mr. Chairman and Gentlemen—I am exceedingly thankful for your vote, and also for the way in which it has been supported by the speakers. I feel it is a little more than I deserved. I am very glad that you appreciate the efforts of the Government to help the producers. I am particularly delighted to know that you so fully appreciate the action of the Honorable the Minister of Agriculture in introducing this new strain of stock amongst the herds of the colony. I cannot promise Mr. Smith, of Hawker, that a few of these bulls will be sent up to his district.

MR. SMITH : Not one ?

The COMMISSIONER : Considering there are only eight imported this year. The Minister, when he returns to Adelaide, will arrange how they will be distributed. My own idea is that more should go to the dry districts, where so much stock has been lost by the drought. (Hear, hear.)

A VOICE : It is no use sending them there if they have no cows.

The COMMISSIONER : They will no doubt be able to get some cows. I thoroughly agreed with the Minister when he spoke about importing these bulls. I believe there are no people in the country who work so hard as the dairy farmers. They have to work night and day, Sundays and Mondays, and every other day. No people work so hard and get so little for their labor as they do, and it is the duty of the Government to assist them above all. (Applause.) We have a country where we can raise any amount of butter, and export in large quantities, provided we only got the right sort of cattle.

The GENERAL SECRETARY : And the food for them.

The COMMISSIONER : As Mr. Molineux says, and the food for them. Well, that is coming too. With regard to Mr. Cornish's remarks about manures and the high prices, the prices might be high yet, but as there is a very great demand for these particular manures, there is not the slightest doubt that private people could arrange to purchase manure in large quantities, and the competition ought to regulate the prices. I can promise you this, I think, on behalf of the Minister, that if we find there are extraordinarily heavy prices and that the importers stick out for big profits to the detriment of the farmers and producers, the Government will undertake to get a cargo or two of manure themselves. (Applause.) I am very glad that Mr. Hardy has seen fit to make the remarks he has done with respect to the Phylloxera Bill, because I believe that his words will have considerable weight with the growers of South Australia. In introducing this Bill the Government were told that its provisions were altogether too drastic and that it was going to knock out a lot of small vineyards. I do not profess to know much about vineyards, but I do not think they would take much to knock them out if this Bill were going to do it.

MR. HARDY : Hear, hear.

The COMMISSIONER : Because the charge that would be made would be only a small or nominal one. I quite agree with Mr. Hardy that to be forewarned is to be forearmed. All the provision that we have made for selling our wines in England will be of no avail if we allow the phylloxera to come amongst our vineyards. For these reasons the Government will push on the Bill, either in its present or in an amended form. The discussions amongst your Agricultural Bureaus will help the Government very considerably, and we look forward to getting your assistance and advice in this particular measure. It is very pleasing to know that the actions of the Government in various ways have been appreciated. The Kingston Government were called the Labor Party's Government at one time; now they are called the Producers' Government; I suppose that the time will come when we shall be called the Squatters' Government. We do not care what we are called as long as we know that we are doing our level best to push on and develop the best interests of this colony. (Applause.)

### The Chairman's Address.

THE CHAIRMAN OF THE CENTRAL BUREAU (Mr. F. E. H. W. Krichauff): Before reading my annual address I should like to say that if you do not combine to get a shipload of nitrate of soda from Chili I hope that the Government will introduce it. There is not a more important manure for South Australia than nitrate of soda. (Applause.) In meeting the members of so many Branches at this our Ninth Congress I wish to express my sincere regret that such a large number of our settlers in the northern and north-eastern hundreds and our pastoralists have passed through an almost unprecedented drought, which, with them, no advance in the prices of our staple produce could alleviate, although other parts of the province have profited by the rise. The rains this winter, for many districts perhaps rather late, have so far been pretty general, and I hope and trust that those who have been in sore straits may be blest this season with a plentiful harvest, enabling them to return to the district councils any amounts which may be due for seed wheat to the Distressed Farmers' Fund, for any horse feed supplied, and for all to make themselves again comfortable. Although I hope it will never be needed again for so many settlers—for adversity teaches at least desirable lessons—we are all aware that bad crops will be found almost every year somewhere, and for that reason the Distressed Farmers' Fund should remain a permanency, based on moneys so returned and any balance which we now hope may remain in hand. Expectations of high prices for our wheat must not be too sanguine. Although the average under wheat in the United States has declined since 1884 very considerably, the increased area under wheat in Argentina will most probably fully compensate for that deficiency.

A great loss to science, personally to me and some other members, and also to our Bureau, in which he took a sincere interest, as indicated by ever so many letters to the Secretary and myself, was the death of Baron Sir Ferdinand von Müller, K.C.M.G., and besides other members of our Bureaus of whose death I may not be aware, we regret the deaths of Messrs. Wm. Kilmeier of Tatiara, E. Heard of Balaklava, and Felix Gray of Riverton Branch. From abroad we have to record the death of Professor Dr. Emil von Wolff, who convinced Baron von Liebig of the value of nitrogen in connection with the mineral manures, which the Baron first recommended. Von Wolff conducted as principal for forty years the Agricultural Academy at Hohenheim, which sent forth thousands of young men with new ideas, which revolutionised agronomy in Germany, the same as we know our Agricultural College is now gradually doing here. Amongst his writings is one of 200 pages on the use of manures, which, after translation into eight languages, is probably in more hands than any other book on agricultural subjects.

The greatest international horticultural exhibition ever held during five months in Hamburg has unfortunately not induced any of our colonists to send wines or fruit. In Ireland they have shown by a grand festival their gratitude to Providence for the introduction of the potato, three centuries ago. I had hoped that Mount Gambier, as so very much interested and requested to do so by myself, would have forrestalled Dublin.

The new regulations against codlin moths as regards spraying are much disliked in affected localities; and whether really as effective as desirable is in the opinion of many fruitgrowers doubtful. In my own opinion to destroy all fruit in affected districts, and to give partial compensation, is more likely to give satisfaction, but difficult to attain. I hope that Baron von Schilling's glass traps, now praised in Tyrol, are more successful than others tried in Tasmania; we shall soon have particulars. None too early many vinegrowers try now unitedly to keep the dreadful Phylloxera out of the province. Although amend-

ments to the proposed Bill are necessary, it should be passed without delay. Prevention is better than cure, and after all the annual levy made on vine-growers would be only a premium, which is ungrudgingly paid on a fire policy.

The proceedings of the Central Agricultural Bureau and of the Branches, formerly published in our *Journal*—which I think has been useful—are now embodied in the *Journal of Agriculture and Industry*, and appear in book form. If the subsequent numbers contain as much information from different sources you will no doubt value the publication and prefer it to the old *Journal*.

Amongst farmers the love of a garden is not so general as it should be, for, as Lord Bacon said, "It is the purest of human pleasures and the greatest refreshment to the spirit of man. To many it would suggest the paradise regained" when they can find a little time for relaxation from the usual hard work. Children especially will never forget when grown up the pleasure they derived from their own little garden, although disappointed so often if what they sowed or planted did not grow within twenty-four hours. It will be another link in the chain to keep sons and daughters of our farmers on the land, and satisfied with a quiet rural life, instead of flocking to centres of population; and those that love and enjoy their garden, let them always remember that by giving freely from their seeds and cuttings, or plants, when asked for them, they add to the enjoyment of life of their friends and neighbors. Such reciprocity and exchange will be the best foundation for a lasting friendship amongst families, if all enjoy with you culinary—the way to the heart goes through the stomach—useful, and ornamental plants, which otherwise might be more difficult to obtain, or beyond the means of some. And I am glad to observe that the members of Branch Bureaus distribute seeds or plants which have proved a success after some member has raised them from Bureau seeds. But I hope the same will be done with other seeds and plants, and the results should affect the appearance of the settled parts of South Australia in beautifying the landscape, which frequently looks barren and uninviting.

The farmers of the United States, and especially of California, are in many respects in advance of us, and the energy shown in establishing new rural industries is astonishing. I will not now speak of the production of wines, of prunes, of dried and canned fruit, &c., and only mention olives and sugar from beet, for both of which South Australia is quite as suitable. It is not many years ago that California commenced to plant olive trees; now the yearly net gain from the oil produced there is already three million dollars, and the home-produced oil drives imported out of the United States. The same result will shortly follow the cultivation of the sugar beet. In nine of the States factories are now at work that have cost enormous sums; but these pay under good management, and German capitalists have started some of them. The first factories were erected in 1891. In 1895 already 49,230,000lbs. were produced in California and 14,918,800lbs. in Utah and Nebraska, and this although, since August, 1894, the Government did not grant any further bounty. Farmers all over the Union seem now to be in ecstasy about having found a product which at present pays them better than any other. Farmers here might be more inclined to grow sugar beet, in suitable localities, if a premium per ton of the roots be paid for growing them, instead of a bounty for the sugar. I have written to Germany trying to induce a firm to establish a factory here.

Our Agricultural Bureau has been established in 1888, and since that time has tried to induce farmers to establish industries with some success, especially wine-making and dairying; but let us plant more olives and establish sugar factories. For some years the members of the Central Agricultural Bureau have remained the same in number; but last month three more members have been appointed, Messrs. Miller and Price, M.P.'s, and Mr. Robson. A fruit expert

from the Hills and a miller would still be desirable additions. The number of our Branch Bureaus is now 103. Most of them have fifteen members, but some few of the Branches appear somewhat discouraged in consequence of the drought and poor attendance of the less energetic members. On the whole, however, the working of our Bureau has been admired abroad; non-members frequently attend meetings of the Branches; good progress is made by informing our settlers throughout the whole province of the experience and the experiments of the members of Bureaus, and also of the general advance in scientific, experimental, and practical farming in other countries, or rather of agronomy as a whole. How important such information is to enable us to be at least on a level, if not in advance, of other countries is more and more recognised by our settlers. Sir Humphrey Davy stated, in reference to the great importance of experiments—"Nothing is more wanting in agriculture than experiments, in which all the circumstances are minutely and scientifically detailed"; and Liebig's remarks remain true—"Perfect agriculture is the true foundation of all trade and industry—it is the foundation of the riches of States: but we must apply scientific principles, based on an exact acquaintance with the means of nutrition of vegetation, and with the influence of soils and actions of manures upon them." Only quite lately, after many failures, or at least poor crops, have a greater number of our farmers recognised the truth that our soil requires manuring, especially so long as we remain, in the main, wheatgrowers. The fact that many fertilisers were not in sufficient quantity in South Australia to satisfy the inquiry is highly significant of an awakening, stimulated by excellent isolated trials and several lectures read and published in our *Journal* of last year. Great attention will even more generally be paid to the results of all the trials now being made this year with fertilisers and drills, which have so completely revolutionised farming, more especially in Germany, formerly so much behind England. A few months ago I reported the large consumption of nitrate of soda in Germany of a value of £3,250,000; but importations of guano from the Chinchas Islands, and more lately from Damaraland, in South-West Africa, and oilcakes of all kinds, are there hardly of less importance, while the use of Thomas phosphate and potash salts is ever increasing. Germany used in 1896 1,082,388cwts. of muriate of potash of 80 per cent.; also 11,150,552cwts. of kainit and sylvenit, 1,130,814cwts. of carnallit, and other potash salts in smaller quantities; while Great Britain used 244,346cwts. of muriate of potash and 416,358cwts. of kieserit, and the United States 2,703,174cwts. of kainit and 955,112cwts. of muriate of potash. Seeing the interest taken in manuring with any of the above and other commercial fertilisers, I shall endeavor to summarise as many of the trials made as come to my hand for publication in our *Journal*, and earnestly hope that, if the fertilisers have been applied in proper time and in accordance with instructions without—or better with—the use of the drill, there may be a new era of prosperity in store for our farmers. I regret, however, that many have misapplied kainit. Valuable as is the use of these manures, cultivation must not be neglected, as is only too often the case here. There are many proverbs which contain a wealth of truth; so it is said in Germany "You can hoe the sugar into beets," for it is an established fact that one hoeing is equal to manuring with  $\frac{1}{4}$ cwt. of nitrate of soda. "The soil must be able to breathe" is another saying which should be posted at every farm to remind us that the admittance of the oxygen of the atmosphere through the pulverised surface soil is as important as the breaking up of the capillarity of the hardened soil, which would otherwise permit the escape of the moisture from the soil. The rolling of your stiffer soils may be advisable, but the subsequent use of a light harrow to open the soil again must not be neglected. The loss of plants by it, of which some persons make so much,

counts for nothing. A fine seed bed is good, but subsequently to keep the soil open even more so.

And we have yet to deal with another matter, if we hope to obtain a good and clean crop—we must destroy weeds by all the means in our power. Clods contain ever so many dormant seeds, and therefore should be well broken down when the land is fallowed. It should not be forgotten that Putensen counted 25,000 seeds of weeds in a square metre, or 100,000,000 per acre. This care of nature to always clothe our pastures again with herbage from seeds which remained in the soil and retained their germinating power for many years, is a blessing which the farmer on his arable land does not appreciate; but without a struggle there is no victory. We must sow only grain or seeds perfectly free from the seeds of weeds, and battle always with them in a determined manner, as they rob us of part of our income. May this Congress give grains of usefulness to all of us!

The CHAIRMAN: Mr. David Wilson, the dairy expert from Victoria, has arrived and is present in the room. Many of you made his acquaintance when he was in Adelaide before. I believe that Mr. Wilson was the first person who showed and explained to us at a former show of the Royal Agricultural Society in this city the use of the separator, and we can never forget with what curiosity the people from the country districts looked at the experiment which Mr. Wilson showed us at that time. I am sure we will all give Mr. Wilson a very cordial welcome amongst us. (Applause.)

Mr. WILSON thanked the members of the Congress and took a seat near the Chairman.

Mr. W. PEARSON (Meadows Branch): In your address, Mr. Chairman, you emphasised the use of nitrate of soda. The prejudice in favor of bonedust is so strong that it seems very difficult to get many people to use any other manure. I found that last year by the application of a little nitrate of soda as a topdressing to a crop heavily manured with bonedust, I got an additional yield of at least a ton of hay per acre at a cost of 12s. I used 30 cwts. on my small farm, and anyone could distinguish, from a long way off, the portion of the paddock on which the nitrate was applied. I was so pleased with the result that I invited members of the Bureau and gentlemen in the district to come and see it. I fully agree with the Chairman as regards the price for manures. I see the advertised price in Europe is £8 per ton, while we had to pay £13 per ton here. I hope the farmers will combine so that we may get our manure at a very much less cost next year.

The CHAIRMAN: Hear, hear.

Mr. PEARSON: I do not approve of asking the Government to get manure for us. We ought to combine and procure it ourselves. I understand that the Farmers' Co-operative Association, with premises at the Port, imported large quantities of manure this year.

A VOICE: Quite true.

Mr. PEARSON: Well, could not the Bureau unite with the Farmers' Association, and by that means get out large quantities of manure?

Mr. MOLINEUX: That is the way.

DELEGATES: Hear, hear.

Mr. W. CORNISH (Gumeracha): Seven years ago I sowed an extra quantity of bonedust on a wheat crop. I saw the advantage of it. I took off two crops from the land, and the paddock had gone to grass for five years. This year I cultivated it again, and I was quite astonished a few days ago when I caught sight, a quarter of a mile off, of the extraordinary growth in the paddock. I was unable to account for this until I remembered that it was just there that I doubled the quantity of bonedust seven years ago. That shows that bonedust remains in the soil as a fertiliser for years if you put a large quantity in.

Mr. PEARSON : It should be remembered that what will feed one soil might and does poison another soil. I have been using bonedust for twenty years at the Meadows, but it would not answer everywhere.

The CHAIRMAN : Was the bonedust used by Mr. Cornish coarse or fine ?

Mr. CORNISH : Rather coarse.

The CHAIRMAN : That probably accounts for it.

Mr. CORNISH : It was obtained from the Blumberg crushing mill. What has been said about manures plainly teaches us all a lesson. We want to learn the necessities of our soils. One gentleman says he finds such and such a manure will answer in his part of the country, and that is correct : and so what I say is correct as regards my part of the colony. We all want to experiment with the various kinds of manures, and select those that will suit the particular soils in our particular districts.

Mr. SAMUEL GOODE (Central Bureau) : There is not the least doubt, to my mind, that no better manure can be used than bonedust. If it is fine and applied to the soil it acts almost immediately, but if it is applied in a coarse state it will last for quite seven years before its effect is lost.

Mr. J. BROWN (Port Victor) : In a case where coarse ground bones were put on the land fifteen years ago, and a crop taken off, you can still see the effect of the bonedust on the grass. Every part of the field was manured, but where the crushed bone was applied was the best. I have used bonedust with considerable profit, and I always expect to get as much good out of the land the second year with bonedust as in the first year. This year I tried Kangaroo Island guano because I could not get bonedust. Though I could see a difference in the crop, the difference was not so much as it was with bonedust (Hear, hear.)

Mr. M. HOLTZE, Director of the Botanic Garden (Central Bureau) : Bonedust is very good, but cultivation is as essential and as effective as manure. Cultivation will, in fact, do almost more than manure. I will tell you the experience in the Botanic Garden. We have a round bed near the palm house : this was manured, seeds were sown upon it, and the gardener reaching with his hoe loosened up the soil as far as he could reach without treading upon the bed. The result was that where the soil was hoed the plants are twice as high as in the portion of the centre where the gardener could not reach.

Mr. H. KELLY (Central Bureau) : Your address, Mr. Chairman, is a very able one indeed. You have gone over a great deal of ground which is well worth consideration, so much so that those farmers who take it and read it steadily will want to undertake some of the things you suggest. It is stated that at the present time there is a market for our produce, and a good market too ; but we must not always rely upon that. We have formidable competitors to encounter in the cultivation of wheat. This year in Russia and other countries there seems to be a dearth in the wheat crops, and it will be an advantage to this or any other colony that has any wheat to sell. We have a formidable adversary in Argentina. There is a most wonderful country—Mr. Sinclair, the Victorian produce export, travelled over that country—with 250,000,000 acres of land, where the Government allows everything for the land to come in with only a duty of 5 per cent., so that agricultural implements are admitted there at a most reasonable price. The Argentine Republic is doing its very utmost to settle the people by giving them the greatest possible facilities. As regards fertilisers, there is no man in the colony who recommended them sooner, Mr. Chairman, than your old friend Dr. Muecke, who is now living at Hahndorf. He told the people of Tanunda what would happen if they did not use fertilisers. I saw Gumeracha district fifty-seven years ago, and you see it now. The land is there just the same, but it is bare. Those who use the seed drill and the fertilisers will see things improve. I believe

that there have been a good many experiments since the report by Mr. Goode and myself on the subject of the use of combined manure and seed drills on Yorke's Peninsula was published. If we can procure these fertilisers at a reasonable rate and get them in pure we shall do well. When the Chairman was a member of the Legislature of this colony he did his utmost to get the provisions of the Fertilisers Act put into force. Fertilisers of an inferior quality are being sold, and many farmers will be sadly disappointed unless they obtain a certificate that the manure is of a certain standard. I should like to call attention to the work of the Bureau, and the small sum of money which is granted us by the Government. Western Australia has a Bureau; a branch, you might almost say, of this colony. The Government there gave over £4,000 a year to the Bureau to enable it to do its work; though I venture to say it is not doing one-tenth of the work the Bureau in South Australia is accomplishing. I am glad that we have members of Parliament on the Board now. When they see the work that this Bureau is doing, I hope they will recognise that we ought to be treated more liberally than we are now. (Applause.) We know what Mr. MacDonald did near Roseworthy. For thirty-five years he never used a fertiliser. It was the method of working his land that was the secret of his success. I was judge with Mr. Goode, and twice or three times he took the Angas prize for the best farm. If Professor Lowrie were here he would tell you the benefit of capillary action, the opening of the soil to admit the moisture. I hope that this Congress will be productive of great good. (Applause.)

MR. JAMES UMPHERSTON (Mount Gambier Branch): I have much pleasure in moving a vote of thanks to the Chairman for his excellent address. I think his observations are quite in accordance with the plans we desire to follow. As to the suggestion of getting Government assistance in procuring manures, I think that the less we have to do with the Government the better, and the more we depend on our own exertions the better. If the Government gives a guarantee that the manure offered for sale is the genuine article, I think that is all we require. (Applause.) I agree with both suggestions—to use manure and to do without it. It all depends upon the soil. I say cultivate well and use manures just as you find experience teaches. Study the soil, both as regards cultivation and manuring. It behoves us to know what our soils require, and to adopt the manures that suit. Good cultivation will do a great deal where we are not able to get manures.

THE GENERAL SECRETARY (Mr. A. Molineux): I am quite sure that when Mr. Holtze was speaking of equality of cultivation and manures, he meant that they were both equal in value and both were necessary. (Hear, hear.) It is thought that a particular manure will always give a good result. That is not so. You must apply to the soil the manure it requires, and in which it is deficient. (Hear, hear.)

MR. H. KELLY: I second the vote of thanks to the Chairman. I knew the Chairman as a practical farmer, when he used to be in the Bugle Ranges.

MR. T. HARDY: I support the motion. The gentlemen who visit Roseworthy College next week will see a good deal to interest them. Different manures have been tried there this year on a sufficiently large scale, so that anyone can see the results. I think the plots are five acres, some of them. Judging from what I saw a fortnight ago, the farmers will be much interested in what they will be able to see at the College relative to the effects of the different manures.

The motion was carried.

THE CHAIRMAN: I thank you very much, gentlemen. I am with you heartily in your work, and as long as I live I shall always try to advance agriculture in the colony. (Applause.)

At 12.15 p.m. the Congress was adjourned until 2.15 p.m.

## SECOND SESSION.

The Congress was resumed at 2-15 p.m.

**Manuring of Vegetables.**

Mr. H. McKINLAY (Mount Compass Branch), read the following paper, written by Mr. David Wright.

In bringing this subject forward, I want to try to show what a hard task it is to find out the best manure for the soil we have to deal with. About seven years ago I started gardening at Mount Compass, on what is generally known as the Black Swamp, which was nothing but teatree and rushes; the land being very boggy. I had it well drained and broken up. The first year I planted half an acre with onions, and sowed bonedust equal to 2cwts. per acre. The crop was almost a total failure, except upon a few burned patches. I also planted potatoes, using bonedust, and they turned out very badly. I put in some cabbages and turnips and had a fair crop, using bonedust. Two years ago I tried bonedust and superphosphate mixed. The bonedust was dug in and the phosphate sown on top. The quantity put on was about 5cwts. per acre. From this I had a good crop of onions, but other vegetables were only a medium crop. I tried blood manure, but it was a failure. I think the reason was that it was such a bad sample. I have also tried superguano with no better result. The land has been well worked, both with the spade and hoe. I have put a large quantity of bonedust with it, but there seems to be something wanting. Either a mixture of different kinds of artificial manures, or else one which I have not tried. I believe farmyard manure would be very good, but we cannot get it here. If we could get blood manure properly manufactured we would obtain good results. This season I intend to experiment with most of the different kinds of manures, and try to find out which is the best suited for the swamp lands.

A DELEGATE: We find different classes of manures suit different classes of ground. Last year I used Kangaroo Island guano, and alongside I had superphosphate, and they gave far different results. The land seems to be so very different in places, so that only actual experiments will enable us to ascertain what will suit.

The CHAIRMAN: I am very sorry that Mr. McKinlay has not given us much of an idea of manuring vegetables. We did not know that it was intended to speak only of swampy land. You have not told us anything about potash manures, Mr. McKinlay. It seems to me that the very manures you have omitted to use are those you want. I know, for instance, in Oldenburg, in Germany, where they have so many moors and swampy lands, that the manures chiefly used are the potash. So please do not omit the potash when you manure again, Mr. McKinlay, and, perhaps, a little phosphoric acid with it would benefit.

Mr. J. HILL (Mount Barker): I quite agree, Mr. Chairman, that potash manure is very useful. Our fowlyard manure is a valuable product.

Mr. JAMES UMPHERSTON (Mount Gambier Branch): You have two soils mentioned in the paper. If I remember the locality well—and I think I do—you have decomposed vegetable matter on the swamp very deep.

Mr. McKINLAY: It is mostly deep.

Mr. UMPHERSTON: And on the sides you have sandy or spewy soil?

Mr. McKINLAY: Yes.

Mr. UMPHERSTON: Well, it appears to me that first of all the land should be thoroughly drained. It will not carry a crop of any consequence until it has been thoroughly drained. You might cart the stuff out on the higher land and make manure of it, rather than go on now as you are doing, trying to cultivate it. No manure in that part of the colony would do any good until the land is drained.

Mr. McKINLAY: Of course we have drained the land. The drains are 2ft. 6in. and 3ft. deep in some places.

Mr. UMPHERSTON: It is poor soil, though.

The GENERAL SECRETARY: In these swampy lands it generally happens that,



unless well drained in the first place, the soil is deficient in nitrates, notwithstanding the presence of great bodies of organic matter. If land is drained for some time, then nitrates are produced by natural means. I suggest that nitrogen in these soils—if you must cultivate them—is necessary for the first few years, in addition to the other manures. You could provide nitrate of soda and phosphoric acid, for instance.

Mr. J. BROWN (Port Victor): I have grown vegetables on black, peaty land. There is a black, very heavy land, a sort of black clay, that requires lime in the first instance. In growing vegetables I believe in bonedust and superphosphate mixed. I would recommend a mixture, which I think would probably beat that which has been suggested to-day, viz., a mixture of six of superphosphate, two of nitrogen, and two of potash; that would take the place of fowlyard manure.

The CHAIRMAN: Why not take basic slag, which contains a quantity of lime, instead of superphosphate?

Mr. BROWN: I have not tried it and cannot say how it would answer.

The GENERAL SECRETARY: I would like to point out that basic slag contains more lime than is found in superphosphate.

Mr. BROWN: I would suggest the use of lime on stiff heavy land. I believe it would well repay the cost of labor on any clay.

Mr. J. HILL: I have used small dressings of salt with considerable advantage on our Hills land.

The CHAIRMAN: Common salt?

Mr. HILL: Yes.

The CHAIRMAN: Is there any efflorescence in your land, Mr. McKinlay?

Mr. McKINLAY: No.

The CHAIRMAN: That shows that in all probability potash will help you. But I would remind members that the subject under consideration is the manuring of vegetables.

Mr. W. PEARSON (Meadows Branch): Although I have tried to read, mark, learn, and inwardly digest, it is very difficult to digest all the lessons. There is so much contradiction in the matter. Sometimes you use a certain kind of manure and it seems to be a success, while in another year it may be a failure.

The CHAIRMAN: Is it due to climatic conditions, do you think?

Mr. PEARSON: We appear to be so mixed up that we do not know whether to attribute the success or failure to climatic conditions or the manure. I have used bonedust and superphosphate with potatoes, and I have generally used these with stable manure. I think I have obtained the best results from a top dressing of nitrate of soda or sulphate of ammonia. When a crop begins to languish I have always found that a little nitrate of soda or sulphate thrown over the land gives it vigorous growth. A little bonedust might be ploughed or dug in early in the winter, and if the land requires a stimulant later on a little nitrate of soda or sulphate of ammonia might be applied.

Mr. T. BEST: When do you use the manure?

Mr. PEARSON: I generally get the manure in as soon as I can; in fact, as soon as the land is in a fit state to take it.

Mr. PETER SOMERVILLE: I have been growing vegetables for a considerable number of years. I have not had much to do with these artificial manures, as I have used good stable manures. Perhaps that is owing more to the fact that I have been amongst horses a great deal. I have always taken particular care to get the manure as soon as possible into a heap, and keep it from burning, and when I came to use it I have had it like our dung heaps in the old county, so that it could be cut almost as solidly as cheese. A gentleman near where I am living, who is a most energetic gardener, had a piece of land almost exhausted. Last year he ploughed it in the summer

months and let it lay in fallow. He planted potatoes, and gave the land a sprinkling of bonedust. I venture to say that there is not a better piece of wheat land in Australia than that just now.

Mr. A. MOLINEUX: It is the same ground, is it?

Mr. SOMERVILLE: Yes. The difference between the two crops is something marvellous. This gentleman is a great believer in bonedust. He has planted peas which have just been manured with bonedust. I have grown carrots and other vegetables from fine ordinary manure, with the ground worked well. On the plains my time for sowing carrots and beetroot, which I think is analogous to mangolds, is about the 24th of August, when the crops would not run to seed. If sowed much earlier than that I would find a lot running to seed. These carrots and parsnips would last for nearly a twelve month. We would have them through the summer, and it might be June or July before they ran to seed. It is important to select for planting a time when the crops would not run to seed. I would recommend anyone on the plains who has the power to irrigate, as many have, to start about August 24th, or from then to the beginning of September, and if the ground is well worked, and you have what is called double digging, the bottom "forked" about and the soil made about 20in. in depth, you get a splendid crop all the season through. The manure we had was so well rotted that I had no difficulty with what is called "forking." I have great faith in the utility of bonedust in ordinary soil. I believe it is one of the most suitable manures we have got.

Mr. A. MOLINEUX: Did you cultivate your vegetables, giving the soil plenty of loosening up?

Mr. SOMERVILLE: We used to put on a pretty good mulch, but by very much mulching I found the ground was difficult to work in the following season sometimes.

Mr. J. HILL: I have found the little J. R. Planet Jr. tools, with irrigation combined, to be very serviceable. If you irrigate and do not loosen the land at the same time it is not good.

The CHAIRMAN: I suppose Mr. Somerville agrees with me that it is not advisable to use fresh dung for any of these root crops, because they would be forked. Therefore, whoever intends to raise good carrots, parsnips, and such like, would have to use the manure the year before and make the ground loose for a considerable depth so as to draw the roots down. I have tried the Oxheart carrot for three years, and I should think it would grow remarkably well on the plains. You can thin it easily, and whether the ground on the plains is dry or not, you can always draw the carrot out with your hand without a spade, or anything of that kind. That, of course, is a great advantage to the lady of the household, who can thus gather the carrots herself.

The GENERAL SECRETARY: That is not manuring of vegetables, is it?

The CHAIRMAN: I think it is well to call attention to these things, nevertheless. The production of potatoes is one of the very greatest importance to us, and I would like to direct attention to the necessity of using potash manures for potatoes. It is all very well to say that potatoes do well, but you will treble your crop by using potash manure, more especially where the soil is of a sandy nature. This year again I have tried muriate of potash, together with Thomas's phosphate, which you can use at the same time; and there is no difficulty with muriate of potash, as with kainit, which you have to put in before, so as to incorporate with the soil. Muriate of potash is used not a very long time before you put in your tubers. Of course we have a favorable season to some extent. Where the rain falls we can use these mineral manures with advantage, and there is one benefit, especially with the kainit, and that is that it actually attracts the moisture and keeps it. Common salt put on the land will keep the soil moist for some time. Kainit contains a considerable quantity

of common salt. For that reason I would advise even the Mount Gambier potato producers to make a trial. Mount Gambier soil has, no doubt, a lot of potash, but you never know until you try whether the potash in the soil is available. Unless you add to it you may not reap the advantage. If you look at the very small quantity of potash in Australian soil compared with that in English soil you will come to the conclusion that potash itself is of the utmost necessity for most of our lands here. I have referred to the difference in my papers.

Mr. J. UMPHERSTON (Mount Gambier Branch): Do you suggest that there is plenty of potash in the soil if it is only made available?

The CHAIRMAN: Do you mean as regards potash in the Mount Gambier soil?

Mr. UMPHERSTON: Yes.

The CHAIRMAN: I believe that there is nothing else to be done but cultivate, cultivate, cultivate your soil. Let the oxygen of the air work upon it, and then you will have the manures in the soil made available.

Mr. J. HILL: Even our wood ashes contain potash, and we should take great care of them. If we take fowlyard manure and mix it with potash, it would be found very valuable. We should collect our wood ashes instead of throwing them away, and if we distributed them over the land we would have a useful fertiliser.

Mr. UMPHERSTON: They would do very well for an onion bed. (Laughter.)

Mr. HILL: If you got a good onion bed, it would pay very well. We throw away much of our useful manure. I collect fowlyard manure every day in tubs, and have found it most useful. You have given us some good information about potash, Mr. Chairman. I say, preserve your wood ashes and use fowlyard manure.

A DELEGATE: What is the cheapest way to obtain potash?

The CHAIRMAN: It is advisable to use muriate of potash in South Australia. It contains much more potash, and with it there is not the danger that you might have with kainit, in applying it at the wrong time. Ever so many persons, to whom I have sent potash salts, applied it at the time when they put their crop in. That was the worst thing they could do. I killed a little crop of potatoes once by using it as a top dressing. (Laughter.) It must be incorporated with the soil some time before. Muriate of potash costs three times as much as kainit.

A VOICE: Thirteen pounds per ton, I think.

The CHAIRMAN: That is about the price. After what has been stated to-day we shall probably see more manure merchants in Adelaide next year, and then we shall get our manures cheaper than at present. We see Auckland and other papers advertising manures at a reasonable rate, and as for £13 per ton in Adelaide next season—well, I think the time has gone by when merchants can get prices like that. (Applause.)

The GENERAL SECRETARY: Muriate of potash contains three times as much potash as kainit, therefore, if you pay three times as much for it you still get what you want. As to the recommendation to save and use fowlyard manure and wood ashes, that is all very well where a man has a square rod of ground to cultivate, but where he has a large area it would not answer. Our wood ashes contain much less potash than the English or American. There is more potash in English and American soils. I see that some of our agricultural papers are recommending the use of wood ashes at the rate of forty loads per acre. (Laughter.)

Mr. HILL: We are supposed in this colony not to waste anything.

The GENERAL SECRETARY: I quite agree with that.

Mr. HILL: Why cannot we use wood ashes. If they are good for the few they are good for the many.

Mr. J. W. DALL (Nantawarra Branch): I should like members of the Bureau to learn a little lesson that I learned last year. I found it very difficult indeed to grow turnips. I think it is well to save everything we can turn to account. I mentioned to a friend of mine that I could not grow the turnips as I should like. He suggested that I should collect all the old bags and boots and shoes, and stuff of that kind, burn them, and save the ashes to put on the turnip-bed. This, he said, would make a considerable difference, and I found it did. Where we killed our own meat, a good many sheep's heads and feet were lying about. I gathered these, together with all the old boots and bags that I could get, and burned them, afterwards putting the ashes on the turnip-bed, and certainly, so far, the result appears to be very favorable. This is the first year I have tried the experiment, and the turnips are now well advanced, and give every indication of a fair crop. If this experiment is the means of producing a fair crop of turnips, even on a rood of ground, I think you will all agree with me that it is an advantage to the household. (Applause.)

The CHAIRMAN: Are they growing yet?

Mr. DALL: Yes.

The CHAIRMAN: Well, then, apply nitrate of soda as a top-dressing, and you will have a fine crop.

Mr. HARDY (Central Bureau): The great object of the Bureau, I take it, is to receive and impart information. I would like some information. Perhaps I shall be able to get it from some gentleman present. Although not applying to the manuring of vegetables or swampy lands, it deals with the manuring of land. We are in the habit of manuring some of our older vineyards with bone manure. The question I would like answered is—When is the proper time to apply the bone manure? We have been in the habit of deferring it until the second ploughing. The practice now is to plough the vineyards twice—the first time away from the vines, and the second time towards them. Up to now we have applied the manure at the second ploughing, supposing that by so doing we turn it down to a greater depth, in order that the roots may get it. It is objected that if the manure is applied at the first ploughing you turn it down and turn it up at the second ploughing, which would be the case to a considerable extent. I would like if possible to hear the opinion of practical men on the subject. We have found it beneficial to manure vineyards twenty years old, and it pays us well.

Mr. W. F. SNOW (Central Bureau): I have had a great deal of experience in the manuring of old vineyards in France. I have got the French viticultural papers regularly during the nine years I have been in the colony, and I can see perfectly well that the vine requires potash more than anything else. If you take the chemical analysis of the ash of the vine you will find that it contains double as much potash as any other known plant. Then it therefore consumes an enormous amount of potash. You cannot take plant food from the land year after year and expect to go on cultivating for ever; you must put something back in the land, and although the vine consumes a great deal of nitrogen and phosphoric acid, the great standby of the plant is potash. Mr. Hardy asked a very pertinent question as regards the time for manuring vines. I believe that much is gained by getting the manure on the land before the rains, so that the rains can take the manure down to the roots, and by a process of nitrification afterwards, it becomes valuable for plant food. Judging by the experience of the most scientific vinegrowers in France, if more potassic manures were applied to the vine we should get much better results. Kainit I consider poison to the vine, containing, as it does, so much chloride of sodium. I think all vinegrowers ought to be warned against the use of kainit for vines. (Hear, hear.)

The CHAIRMAN: I may mention that experiments are being made by vine-

growers here who have six different plots on which they are using different manures. One of them is using kainit. Mr. Snow has told us that there is no advantage in applying kainit to vines. I would advise Mr. Hardy to apply the manure before the earlier rains.

Mr. W. PEARSON : Did I understand that putting in root crops with fresh manure is advocated?

Mr. P. SOMERVILLE : Fresh manure on root crops is a mistake.

The GENERAL SECRETARY : Several farmers, near to Adelaide and elsewhere, have placed manure on the surface direct from the middens and yards, and when they have done so they have received the benefit, because in carting it out during the dry weather they did not beat the soil or harden it down. Manure in that case is no injury if it is dried directly, but when it begins to ferment ammonia is formed by oxidation, and you lose it. Therefore, fresh manure should be ploughed in as soon as possible. If the manure is put on the surface and ploughed in at once you get all the benefit, because the soil absorbs the ammonia which is formed by fermentation, and is taken hold of at once and locked up until the plant wants it.

Mr. J. UMPHERSTON : Fixed.

The GENERAL SECRETARY : Yes, "fixed," that is the term I was trying to think of.

Mr. J. HILL : It often pays to put a shed over the top of the manure heap.

Mr. J. BROWN : I have never manured vines, but I would suggest to Mr. Hardy that he should sow and harrow it in at the first ploughing. He could try two pieces alongside, to see how the experiment would answer.

Mr. HARDY : Thank you for the suggestion. It is a good idea.

Mr. R. GIBBINS (Cherry gardens) : I would advise Mr. Hardy to put on the bonedust before the first ploughing, to plough it in deeply, and to let the second ploughing be shallow. (Hear, hear.)

A DELEGATE : The Chairman spoke about kainit as something to absorb moisture. I would like to know how much kainit you would have to apply before it could take up an inch of water to the acre. (Laughter.)

The CHAIRMAN : I can merely tell you that you will see a reply to much the same question in the October number of the *Journal of Agriculture*. Professor Lowrie has made certain experiments on the subject. They are not altogether finished. It merely shows that although the measurement does not go to inches, it is an advantage that we ought not to lose. That much we know already. Further experiments will be made. If you will read the little extract which I have made, and which will appear in the next *Journal*, I think you will be satisfied that it is advantageous to use it.

Mr. W. F. SNOW : Mr. Somerville made a remark just now which is of great interest. I mean with regard to the waste of ammonia in farmyard manure. I think that the use of powder gypsum has been very much neglected in this country, where the heat is so great and the atmosphere is so dry. There is not the slightest doubt that in every stable 50 per cent. of the ammonia coming from horse droppings and urine is lost. In Germany, where the farmers are perhaps further advanced in practice and science combined than anywhere in the world, and in some parts of England, every stable has a bag of powder gypsum. A handful is thrown down in the stable, and that has the effect of fixing the ammonia in the manure instead of allowing it to escape. You will find that Professor Lowrie uses gypsum; and if our farmers could only see that they could make their stable manure twice or three times as valuable by putting a handful of gypsum powder in their stable per diem, well, I am sure they would not go along as they are doing now. Gypsum should be used as much as possible, because it certainly does enhance the value of stable manure. (Applause.)

The CHAIRMAN: I have before mentioned the necessity of potash for potatoes. Perhaps we have someone here from the Channel Islands? If so he will know that large quantities of potatoes go from those islands to London. They are raised by manuring with seaweed, which contains potash. That is another instance showing that potatoes require potash.

Mr. J. HILL: Yes; we have it at our very hand and do not use it.

Mr. J. LAWRIE (Port Pirie): Some forty years ago they used to burn man-groves for manure. The salt we get out of the swamps is, I consider, a great benefit to the land. I think it stiffens the straw in the wheat. I always use it for mangolds. I grow a good crop of mangolds, although our country is dry. I have a crop on my land from one end of the year to the other. I am digging good potatoes now. They would have been a splendid crop but for the recent hurricane. Common salt is an advantage, especially when you can get it cheap about these swamps. We have gypsum within some inches of the surface. You can shovel it up like a seam of gravel. I think I shall use it when I go back, because I save a very large quantity of manure. I put on 300 loads of manure this year.

### Fodders for Hills Districts.

Mr. W. PEARSON (Meadows Branch) read the following paper:—

The question of what kinds of fodder plants to grow is of the utmost importance, as the success of the dairying industry depends so largely on it. The dairying industry is of very great importance to the farmer in the South, and especially in the Hills, and I am convinced that it cannot be carried on successfully unless heavy crops of succulent green food can be raised for the cows during the summer and autumn, except in a few favored spots, where there is natural herbage all the year round. These places, however, are few and far between, and even there the yield of milk would be doubled if the cows had a liberal allowance of green fodder. In deciding what to plant three things have to be considered, viz., quality, quantity, and cost; or, in other words, we must decide what crops will give us the best value at the least cost. As there are so many to choose from, this may seem a formidable task. As far as my experience and observations go, however, I think we can at once come down to six, viz., lucern, mangolds, sorghum, maize, prairie grass, and clover in suitable places. I propose to deal with the first four principally.

*Lucern*.—All things considered, I think this the most suitable for the stiff clay soils so frequently met with in the hills districts. The plant is perennial, thus saving labor and expense in cultivating, which is considerable, as this class of soil is very heavy to work, and can only be cultivated satisfactorily in the autumn, and then for annual crops it is useless except for winter green feed. I have found it answer well to sow lucern with barley, oats, or rye on such soils, but the cereals must be sown thinly, and be cut early if at all rank, or it will choke the lucern. When sown thin the lucern will grow all right and be protected from frost, while the green crop is not so liable to lay. Lucern also gives a continuous supply of the best of food from September till June each season. The first two cuttings can be dried for hay, which I consider is the very best feed that can possibly be given to cows in the winter, as they not only give a large quantity of rich milk, but keep in good condition to an extent not equalled by any other food, except corn, that I know of. If liberally top-dressed with manure, four or five cuts, each 2ft. long, can be obtained, making an enormous yield. To obtain the best results the lucern must be cut, not grazed, and be given a good dressing of manure, harrowed in after the last cutting each season.

*Mangolds*.—The old adage "What is worth doing is worth doing well" applies particularly to this crop. I know of no other plant that will respond so readily and surely to liberal treatment, both as regards cultivation and manure. Unless they are so treated, however, the grower will inevitably be disappointed, except on rich virgin soil, which will not require to be manured. I consider from 40 tons to 60 tons of mangolds per acre, not taking into consideration the summer pickings of leaves and thinnings, a good crop, whilst 80 tons, or even more, is within the range of possibility. The thinning and leaves alone will give almost as much feed as is got from many green crops. The land should get a good coating of stable manure, and be ploughed deeply in May. Then in July dress with 4cwt. to 6cwt. of bonedust, and, except on land where salt naturally exists, from 4cwt. to 6cwt. of salt, per acre and plough it in. About the end of August or beginning of September plough lightly and sow the seed in drills about 1½ in. deep, and from 2ft. to 2ft. 6 in. apart. Thin out at hoeing time to 4 in. or 6 in. apart, when they will make rapid growth. About November or December every other plant, or even two out of three,

can be pulled, leaving the root 2ft. x 1ft., or 2ft. 6in. x 1ft. 6in., the latter being preferable if the land is rich and the crop growing strongly. About a month later a heavy crop of leaves can be gathered, and this affords a good opportunity, which should not be lost, of loosening the surface of the ground. The oftener this can be done the better, and I think it pays to do the work with hand hoes, as the plants are tender and get badly damaged by the horse and scarifier, and besides, there is no implement does its work so thoroughly as the hand hoe. The cost of growing an acre of mangolds is about £12 10s., made up as follows:—

	£	s.	d.
Forty loads farmyard manure, at 2s. 6d. ....	5	0	0
Carting and spreading same .....	2	10	0
5cwt. bonedust .....	1	10	0
5cwt. salt .....	0	10	0
Ploughing (two or three times) .....	1	0	0
Hoeing and weeding .....	2	0	0

Total ..... £12 10 0

Land so treated should yield from 60 tons to 80 tons of mangolds, which makes the cost 3s. to 4s. per ton. Many may doubt whether such a crop can be grown, but let us see how it works out. I do not think 8lbs. will be thought too high an average for the mangolds, seeing 30lbs. is no uncommon weight. With the plant 2ft. x 1ft. apart, weighing 8lbs., each the crop will total about 80 tons, but even if half this yield is obtained it will be a good return on the outlay. Then there is another thing which makes a crop of mangolds more valuable than most other crops, and that is it can be drawn on from November till the following September, whereas the others must be harvested within a month or two. I would, however, repeat and emphasize the importance of heavy manuring and thorough cultivation if a good crop is to be obtained. This season, at a neighbor's place, I saw a hired man pulling and scraping mangolds scarcely larger than radishes, and two cows would eat them as fast as he could get them ready. Needless to say, such a crop would scarcely pay.

*Sorghum and Maize.*—The treatment for these is practically the same. They will produce good crops on ordinary potato land, even without manure, but they will certainly give better results if manured. I know of one instance where three successive crops of maize have been grown on a piece of land without any manure, and the last crop was a very good one, being 7ft. to 8ft. high, and very thick. I prefer sowing broadcast to drilling, for the reason that the plants are thicker together and consequently finer than when drilled in. Unless cut very young maize and sorghum should be chaffed, and it is a good practice to mix about a bushel of bran with sufficient maize for one meal for a dozen cows. I find the cows like it better if it is allowed to lay in a heap for about twenty-four hours and become heated. I have frequently chaffed enough to last three or four days, and the cows appear to like the last feed better than the first, even though quite black and apparently rotten. Maize does not seem to give very satisfactory results when fed to cows, and most farmers in our district have left off growing it on this account. Of the sorghums I find *Holcus* about the best. If cut young a second cutting can be obtained.

Red and white clovers, prairie grass, millet, and a number of other valuable fodders might be dealt with, but I consider those already mentioned the best for all practical purposes in the Hills. Lucern should yield about 20 tons of green feed per acre, at a cost of, say, £1 per acre after the first year; mangolds, 40 tons and more, at a cost of £12 10s.; and maize and sorghum, 10 tons to 20 tons, at a cost of £3.

Mr. T. HARDY (Central Bureau): I should like to know the reason why maize is disliked for feeding cows. I recollect, when I visited Kiama, in New South Wales, some years ago, I saw maize growing very extensively for feeding dairy cattle.

Mr. PEARSON: I think it is disliked because it does not give satisfactory results. I will mention one or two instances in my own district. For two years, in December and January, or perhaps a part of November and December and the early part of January, I was feeding cows on the thinnings of the mangold crop, and I was getting an average of two and a half gallons per day a cow. When I finished that I started on the maize crop, and to give the animals every advantage, I chaffed it. In a fortnight the same cows were down to five quarts, just half the milk. I have had the same experience two years following, and I have not grown much maize since. My experience is borne out by that of my neighbors.

The GENERAL SECRETARY: That is certainly not the experience all through America. Mr. Charles Rake has grown very good crops of maize on the plains here up to July. These he got by deep cultivation and heavy manuring. I know one year he obtained a yield of fodder at the rate of 32 tons per acre, or 34bush. of maize or corn from the same stuff. Every year he cultivated maize to a considerable extent on his farm with the most favorable results. The American experience is that maize is the most nutritious kind of fodder grown. It beats sorghum, but for nutriment maize, at the time the corn is glazing, is far beyond any of the millets, and gives most satisfactory results. In the paper just read Mr. Pearson told us that it would cost £2 10s. per acre for carting and spreading manure. I think it is most likely he has not used a manure spreader. Mr. Charles Rake had the Kemp manure spreader. The stuff was raked up on the wagon, and on the field, by turning the handle of the appliance, you can shy the manure out in any quantity you like. I am surprised that, after the number of times it has been exhibited at the shows, our farmers have not taken to this appliance. They have gone on laboriously carting their manure out on the field, while this machine does the work of ten men and does it much more effectively than ten men would do it. It is a simple wagon with very simple machinery, which can be detached in a short time, so that you could turn the vehicle into a market wagon.

Mr. M. BADMAN (Riverton Branch): I know a farmer who paid £40 for some such machine, and it did not work well.

Mr. PEARSON: I would like to point out that I did not find fault with the growth of maize on account of the quantity of the crop, for I have been very successful in that respect. I have had maize 10ft. high, and as thick as possible. I have grown it at the rate of 40 tons to the acre, but it did not compare favorably with the other crops in feeding cows.

The CHAIRMAN: Would that be due, do you think, to its being somewhat watery, through growing too strong and too high and having very little sugar. Perhaps that may have caused your cattle to dislike it. I entirely agree with the Secretary that maize is a very good food for the cows.

The GENERAL SECRETARY: No doubt.

The CHAIRMAN: Has Mr. Pearson ever tried the cultivation of gram in the Hills?

Mr. PEARSON: No. It was tried some years ago in the Hills, having been introduced from India, but it was not a success; but I believe if it were introduced now, when we are going to do more than we did in the early days, it would prove successful.

Mr. T. HARDY: I and some others tried gram, but an insect got into every pod. I believe that was the reason the cultivation of gram was not continued.

Mr. BADMAN: When did your cows like the maize best, Mr. Pearson?

Mr. PEARSON: I think they liked it better when the corn was more in the milky or doughy state.

Mr. R. GIBBINS (Cherry Gardens): I have tried maize in all stages of growth. I have chaffed it with hay and with sorghum, and I have found no better results. It will keep cows in good condition, but decreases the quantity of milk. I have quite given up the growth of maize or sorghum for dairying purposes. Where you can grow Tartarian oats and chaff it with hay I think you will find much better results than with sorghum or maize.

Mr. W. H. HUGHES (Mylor): I do not think that maize is very much good for milk production. It keeps the cattle in grand condition, and pigs will pick up fast on it. I think that clover cannot be beaten for milk yield. For all ground feed—I speak of the Hills—I do not think that lucern can be excelled. I have it under irrigation, and get up to six cuts in the year. In the dead of summer I cut it each month. The first cut would go 3ft. or a little over, and



the others are not so high. In clover I get two cuts in the year off Alsike and three cuts off Perennial Red, but the Alsike really yields most. The cows get thin when they are eating clover, though they are given as much as they like. It is very rank.

Mr. T. HARDY: I would like to ask if anyone has had experience in growing lucern on strong clay land. We have at McLaren Vale some heavy clay flats, rich black soil, to which lucern does not take very kindly. It is difficult to get a good crop off it.

The GENERAL SECRETARY: Have you tried a good dressing of lime?

Mr. J. W. DALL: Has your land at McLaren Vale any salt in it?

Mr. HARDY: Though there are salt spots there, the land I speak of is fairly free from salt.

Mr. DALL: Do you get fresh water?

Mr. HARDY: Yes; perfectly fresh.

A DELEGATE: Did Mr. Gibbins or Mr. Pearson ever test the cream results from feeding their cows on maize?

Mr. PEARSON: No doubt Mr. Gibbins would be able to answer that question more directly than I could. At our factory we are paid by results. I got no higher percentage when feeding on maize than on other feed.

Mr. GIBBINS: There was a corresponding decrease in my case when maize was used.

The GENERAL SECRETARY: If Mr. Hardy tried a good heavy dressing of lime on his heavy clay land, and worked the land as Mr. Pearson has suggested, I think he would obtain good results. He would want some 30bush. or 40bush. of lime to the acre.

Mr. J. SMITH (Hawker): The only kinds of fodder we can get to take root and grow are lucern and sorghum. We have had some splendid sorghum growing in the summer time, and also some beautiful crops of lucern. We have not tried it for feeding dairy cows. I have much pleasure in moving a vote of thanks to Mr. Pearson for his excellent paper.

Mr. HUGHES: I have very much pleasure in seconding that.

Mr. HARDY: It is indeed a very practical paper.

The motion was carried.

The Congress adjourned at 4.5 p.m. until 7.30 p.m.

### THIRD SESSION.

The sittings of the Congress were resumed at 7.30 p.m.

### Agricultural Science Classes.

Mr. JAMES MURRAY (Stockport Branch) read the following paper on behalf of his Branch:—

In order that South Australia can compete successfully with other wheat-growing countries, the members of the Stockport Branch of the Agricultural Bureau think the time has arrived when the usefulness of the Agricultural College might be considerably extended. Agricultural and pastoral pursuits have been, and no doubt will be for generations to come, the mainstay of the colony, and nothing should be left undone to improve and increase the productiveness of the soil. We grant that the Agricultural College is doing good work, and must prove of great benefit to the colony; but it is not doing as much as it might do. The great majority of farmers cannot spare their sons from the farm for three or even two years, apart altogether from the fees that have to be paid. We contend that as the farmers cannot go to the college, the college should as far as possible go to the farmers. This at first sight seems a big and unworkable undertaking, but as it is done in other British colonies, why not here? In the Dominion of Canada, in the province of Ontario, they have five Government colleges, which send out competent men with travelling dairies to go into every part of the province, thus bringing the latest and best methods to the

farmers. Free lectures are also given at the various colleges and other places, and they are all well attended by young men. Results of this are showing in the wonderful strides made in cheese and butter production in Ontario, and the exceptional position which the Canadian cheese has gained in the English markets during the last few years. During 1881 the value of cheese exported to England was \$5,000,000; in 1891, 100,000,000lbs., valued at \$10,000,000; and in 1893 the Canadian export of cheese had risen beyond 133,000,000lbs., which was 53 per cent. of the whole British import, and valued at considerably over \$13,000,000, all mainly owing to the efforts of the Agricultural Colleges throughout the provinces. Cannot the same or something similar be done in regard to wheat-growing and other products? We want educating up to the latest and best means of getting good returns for our labor. We want more scientific education. One great drawback to the farmers is we know very little of the fertilising properties of the numerous kinds of artificial manures now on the market, or the right kinds to mix. Another drawback is we do not know for a certainty what properties our soils are deficient in for producing the best results. A farmer may spend pounds upon manures or combinations of manures that his land does not require, and the consequence is the money is thrown away. Another requirement is knowledge of the best way and time to apply the manures; a mistake here would no doubt be a great loss. The great point is how are we to achieve or get this scientific education? We think only by having classes in connection with the Branches of the Bureau, or in any farming centre where sufficient inducement offers. A student who has gone through his term, passed the examinations at the Agricultural College, and is willing should be appointed by the Government at a moderate salary to travel round the various classes, which could be held, say, once a month, to instruct those who are willing to learn something of the science of agriculture. We do not propose to go very deeply into the science, but perhaps sufficient to teach us how to analyse the soils and manures. The whole matter should be under the supervision of Professor Lowrie. No class to be formed under a given number of members. A small fee might be charged in advance. The lecturer could inform the students what book or books to read up, and at the end of the term examinations could be held and certificates, or something similar, be given to those successful in passing. After reaching a certain standard, if a member wished, opportunity should be afforded him to complete his studies at the Agricultural College. We have no doubt that there are a great number of young men who would be glad to take advantage of this mode of acquiring scientific knowledge who could not afford to go to the college for the whole term. And we think it would ultimately prove of great benefit to the colony at large through the instructor travelling over a large area of the colony, also through increase of carriage on the railways through the increased crops, &c. Trusting that this matter will be thoroughly discussed and brought to a happy issue, we submit the following clauses for the working of the classes, viz.:—

Clause 1. Appointment of a student who has passed his examination at the Agricultural College, or other suitable person approved of by Professor Lowrie, as a lecturer or teacher, at a moderate salary, by the Government. Clause 2. That for a commencement classes be established in connection with the Branches of the Agricultural Bureau, or other farming centres where sufficient inducement offered within easy reach of rail or coach. Clause 3. That no class be started under a minimum of eight members; classes to meet monthly. Clause 4. That a fee of not less than 10s. 6d. per annum be charged, payable in advance. Clause 5. That on a student reaching a certain standard opportunity should be given him of finishing his studies at the Agricultural College if he wished. Clause 6. The course of lectures could be drawn up by Professor Lowrie, and the whole scheme be under his supervision. Clause 7. That where practicable for classes to attend, examinations could be held annually at the Agricultural College by Professor Lowrie, and certificates or other acknowledgment given to the successful students.

Mr. Murray concluded by moving—"That this Congress of the Agricultural Bureau respectfully requests the Honorable the Minister of Agriculture and Education to endeavor to establish a system of agricultural science classes in connection with the Agricultural College." (Applause).

The CHAIRMAN: I would suggest that the proposition be amended by inserting the words "under the supervision of Professor Lowrie." (Hear, hear).

The GENERAL SECRETARY: Yes; and the words "in the country districts."

Mr. MURRAY: I have no objection to doing that. I will move then—"That this Congress of the Agricultural Bureau respectfully requests the Honorable the Minister of Agriculture and Education to endeavor to establish a system of agricultural science classes in the country districts under the supervision of Professor Lowrie." (Hear, hear).

The GENERAL SECRETARY (Mr. A. Molineux): I think that the proposition by the Stockport Branch is an admirable one, and I have much pleasure in seconding it. When we remember that what has been said to-day as to the want of knowledge of many cultivators of the soil of the nature of manures that they wish to apply, or ought to apply, we shall, no doubt, all agree that education on that particular subject alone is very much desired. Some farmers say—"I applied such-and-such a manure, and did not get any result." They do not know what it is. Perhaps the application of potash or phosphoric acid is necessary. Up to quite recently some farmers in the North held that it was altogether wrong to apply manure to the land, because it burned the crops; but the mistake they made was that they used the wrong manure, and in the wrong way. Nitrogenous manures applied to cereal crops directly often has a prejudicial effect, but the experience of the use of chemical fertilisers proves that manures applied in the proper way, and at the proper time, will have a beneficial effect. In older civilized countries agricultural education has been taken up by the Governments, with very great benefit to the whole nation. England, perhaps, has not been so far advanced in that direction, until quite recently, as France. The great Napoleon supported agricultural education, and established agricultural classes and farm schools all over France, and the results have been extraordinary. Denmark has done much the same thing; but Denmark sent instructors all over the country, and when they went to the farms, the farmers found that they had much to learn from them. They did learn much, and Denmark has jumped from being a very mediocre state into one of considerable importance. Agricultural education in America has become almost a science. Millions and millions of pounds have been spent, and large sums are still being expended in all sorts of experimental stations and farms, and not only the Americans themselves, but the people of the world, are benefiting by their work. Germany, too, is not at all behindhand. They have agricultural educational institutions throughout the country. South Australia is about as far behind in regard to specialists for educating the people as any of the Australian colonies, except, perhaps, Tasmania. But we have the Agricultural Bureau—(applause)—and we have, of course, amongst the Bureau some 1,500 of the brainiest men in this colony to pick up and impart knowledge, and so, after all, South Australia is, perhaps, in a better position with respect to agricultural education than all the other colonies with all their experts, and with all the expenditure upon the attempts to educate their farmers. Altogether, I think that this proposition by the Stockport Branch is one that ought to be very vigorously supported by every member of the Agricultural Bureau; and if they do support it, I believe it will not be long before we have the idea carried into practical effect. (Applause.)

Mr. W. CORNISH (Gumeracha): I think we are very much indebted to the Stockport Branch of the Bureau for introducing this subject to the consideration of the Congress. The paper we have listened to is a very good one indeed. Until we obtain the knowledge we are seeking for—that is, scientific knowledge in connection with agriculture—we shall not be able to arrive at perfection, and get the most we possibly can out of the ground. The Gumeracha Branch has already appointed a committee for the purpose of taking up the matter, and I believe that, before another winter passes, a school will be established in Gumeracha for the purpose of imparting scientific knowledge in connection with agricultural pursuits. Hitherto we have been very much like a doctor administering medicine to his patient independent of what the disease might be; and, until we are able to get a proper knowledge of the component parts of the soil and the necessary fertilisers we wish to put in, we shall not bring our profession to perfection. (Hear, hear.) For a long time I have been advocating a scheme—I do not know whether it will be carried out

or not, but I hope it will be—for having our soils analysed. I believe that it is quite possible to educate our young men in this matter. They could come to my place, for instance, and take a section and analyse it. They could take section by section, and they could go to my neighbors and do the same. Lectures could be given in the neighborhood, and they could be taught in what way certain soils are deficient and what manures need to be supplied. They could learn how to detect what is necessary to secure good returns from the land in the locality in which they live. (Applause.) We heard to-day that a manure that did not suit one part of the country does suit another part, yet both manures are necessary for certain soils. We ought to learn what is requisite for our own localities, for the districts in which we live. I very much disapprove of shifting about. I think that a man has a lifetime of education on one farm. (Applause.) I have been more than forty years on the farm upon which I am living now, and I find I have more to learn now than I ever had; and yet I can get as good crops now as in years gone by, and I hope to get better yields as the years pass. I have tried sal<sup>t</sup>, and am trying various kinds of manures. It is an education to us, but the education will not be complete until we know by analyses what we require for the soils. I would suggest that we should visit one another's farms——

Professor LOWRIE: Hear, hear.

Mr. CORNISH: And see what each other is doing. For instance, I should like to visit Mr. Pearson's farm at the Meadows; I have asked him to come and see mine. I should like half a dozen or more to visit my farm and see for themselves what have been the effects of certain kinds of manures and methods of treatment. Last year I tried bonedust and Thomas phosphate and superphosphate side by side. A person would have a much better idea of the utility of those manures if he saw their effects. (Applause.)

Mr. W. J. STONE: I think it would be advisable if a hand-book on manures were issued, that would show us the analyses, and tell us what to use, and how to apply them. We would then not make the mistakes we are making now.

Mr. T. HARDY: I do not wish to throw cold water on the proposition made by the Stockport Branch, but I consider that they are expecting rather too much from a scheme of that kind. I do not think that science classes of the character mentioned in the paper would be able to bring forward young men capable of analysing soils. (Hear, hear.) It would take a good deal more than science classes to accomplish anything of that sort, because the analysis of soils, as Professor Lowrie will tell us, is one of the most difficult things in chemistry; and even at the present time pretty good authorities say that it is hardly possible to arrive at the true nature of the soil of a farm simply through the analysis of small portions of the earth taken from various places. (Professor Lowrie—Hear, hear.) The effect of manures can be ascertained by most people themselves in a very simple way. On a portion of their land they can mark off certain patches, more or less as they think fit. On one they could try nitrogenous manures, on another phosphates, and on another potash manures, and they could then find out from their own land the kind of manure that would best suit. I am doing something of the kind this season, at the instigation of our Chairman, with respect to manuring vines. I think it can be carried further, and this year we may try a few more manures than we are using. Science classes would undoubtedly do good, but it would not be wise to expect too much from them in the way I have pointed out.

Professor W. LOWRIE, M.A., B.Sc., Principal of the Agricultural College at Roseworthy: Through the courtesy of the Central Bureau I had an opportunity of looking at the paper before it was read. There are certain things in it that I am inclined to agree with; there are other things that I think I might justifiably take objection to; and there are other matters which appear to be

altogether wrong and in error. In the first place the paper has proceeded on the understanding that generally the farmers of South Australia cannot afford to allow their sons to attend a technical institution—the Agricultural College, or the University, or elsewhere—where they could get a knowledge of elementary science. I should be very sorry to think that agriculture in South Australia is in such a miserably poor plight that farmers owning land in the colony cannot afford to do that which costs one-third of the expense that many farm servants in my native country of Scotland can somehow afford. There are now in the University of Edinburgh men who are sons of shepherds and peasants. If by thriftiness and very much hard work a young man from the peasant class can take his degree at the University, and attain to a high position in the country, where the cost is £70 or £80 per year, why should it be beyond the reach of farmers' sons here? He may get it by a scholarship, but to obtain that scholarship he has to take it out in hard work. At our Agricultural College the fees are £30 a year. There are six scholarships, but in no year since their establishment have all the scholarships been taken up. There are districts from which a single candidate has never come forward. If these scholarships were in Scotland, instead of having four or five candidates, you would see 4,000 or 5,000 for the same opportunities. And where would these boys come from? They would not come altogether from the well-to-do classes, generally speaking, but from the laborers, carpenters, blacksmiths, small farmers, or farm servants. I think that the Stockport Branch is a little beside the question when they say that the average farmer in South Australia cannot afford to send his son to the Agricultural College. Many can afford to send their sons to St. Peter's, Prince Alfred, or Way colleges, at an expense double that involved in sending them to the Agricultural College. They do that because they think that it is fashionable, and that it may prepare them for some profession; but the professions in South Australia, as everywhere, are very well loaded up. (Hear, hear.) There are better opportunities for men with brains on the land in South Australia than in any profession whatever. (Applause). Why should farmers endeavor, by giving their sons this classical education, to get them to drift into a profession at which they will not make as much as they might do through sending them to some institution where natural and physical sciences are taught, or, better still, at the Agricultural College, where they are prepared for working the land to the best advantage? While I take exception to that part of the paper, I would say again that I am perfectly sure the average farmer in South Australia can very well afford to pay £30 to enable his son to get an elementary technical education. Another reason mentioned in the paper is that the farmer cannot do without his labor. I am sure if most men try they can do without that labor. (No.) Well, I have to speak somewhat plainly on this point.

THE GENERAL SECRETARY: Hoor, hear.

PROFESSOR LOWRIE: I do not think any farmer is justified in keeping his sons on his farm and letting them miss an opportunity for bettering themselves in the world, simply that he himself might have a little more leisure. (Laughter, and hear, hear). I am speaking of what I know. There are heads of families in fairly good holdings in South Australia who go driving, who go to political meetings, tea meetings, Bureau meetings, while their sons are driving the teams.

THE GENERAL SECRETARY: They go to Bureau meetings at night. (Laughter).

PROFESSOR LOWRIE: They go in the afternoon sometimes. Is it fair for a man to let his sons be hewers of wood and drawers of water, while he drives about and deprives them of the opportunity of education, that they might have greater advantages in after life. I do not think any farmer is justified in doing that. A man who has brought children into the world, and has taken the responsibility of rearing them, should give them the best chance possible, that

they might succeed in the competition in the world. (Applause). Do you say that the average farmer in South Australia cannot afford to be without his son's labor, and cannot afford to pay £30 for his education at an agricultural institution? I scarcely think so. The paper goes on to speak of the desirability of greater efforts being made to popularise scientific teaching, that is, to extend a knowledge of the best methods of practice. That, of course, is very desirable in South Australia, as in any other community, and the colony is doing a good deal in that direction. My colleague, Professor Perkins, for example, is spending half of his time in going from one district to another giving addresses and demonstrations on pruning and one thing and another, and I believe that much good has resulted from his work. (Applause). I have lectured in different districts, and, without boasting, am just as well qualified to lecture as anyone who is likely to go out under any such scheme as is here proposed; yet I have gone to fairly large townships and not had an attendance of above eight, and talked on a subject which I believed was pregnant with importance and interest to the farmers in the district. Well, if one in my position, the head of the Agricultural College, cannot get an attendance—in some places one does get a most flattering attendance, but there are certain places where you do not have much of an attendance—one is inclined to fear that men, in a sense smaller men, who are not in such a responsible position, would not get anything like the attendance that either Professor Perkins or I get; so I am a little bit doubtful whether the efforts in that direction would result in the good that the Stockport Branch anticipates. I, however, agree very much with the proposition that evening science classes in certain districts would be of the very greatest advantage to the young farmers in those districts and to even those who are older. (Laughter.) However, I would not expect too much from these evening classes. You may think that by attendance at evening classes for a few years once a week if you like, or say five years, a man would be able to analyse soil, but he could not do it. The profession of analyst requires a very long and practical experience. You might just as well take a clerk from an attorney's office, give him three days' ploughing, and expect him to carry off a first prize at a ploughing match as expect a student who had only the opportunity of attending an evening class to be able to analyse soils. Chemical work of that character requires work in the laboratory; it is not to be got from books. You have to make blunders and mistakes. It is like the practice of farming. Everyone must make mistakes. And so a person has to buy his knowledge of chemistry. It can only be obtained by working at the bench for two or three years, and he would be a smart man if he accomplished the task in that time. My firm belief is that lectures on chemistry are of little value, and that valuable knowledge to be gained is in the laboratory where the student has to work practically. It would be impossible for evening science classes to have such full equipments as would enable young men to get a working notion of chemistry. But I will show wherein I think the scheme could work out well. At these country classes, which might almost be called reading unions, if you like, young men could come together and learn. In Great Britain they have classes under the Science and Art Department. Under that scheme, teachers or farmers, or booksellers, or anyone else, if they manage to bring a sufficient number of pupils together, can start evening science classes. By the regulations they are bound to have a certain number of meetings of their classes. They generally meet two nights in the week. They start about November, and the examinations are held about May; and if they get their pupils to pass first class they receive from the Department £2 for each pupil, and if second class £1 each, while for those who fail they get nothing. Under that scheme I know, from personal experience, that young men have got and are still getting a smattering of science that they

would otherwise never have heard of. In my native district a young fellow, who was a bookseller, induced some of his friends to unite with him in forming a class. A committee was formed according to the regulations, and he started teaching science. He obtained the grants from those who passed in that particular class, and in a few years that man was earning from the Science and Art Department £300 a year from his evening classes; which after all was a very small consideration compared with the good he was the means of doing to the young men in the district. I am bound to do what I can to urge the establishment of such classes. (Applause.) I know from personal experience the great benefit they have been to me, and I think very worthy results would come from such classes here, provided they were not started on too ambitious a scale, and that too much was not expected of them; and provided, of course, the young men who attended had the grit and perseverance to enable them to take advantage of the opportunities there given. I am a bit doubtful whether South Australian young fellows have in them that which is necessary for them to take full advantage of such opportunities. (Laughter.) The youth of this country are too easily and too well brought up. If the colony is to benefit by any such scheme as the Stockport Branch proposes, I think it would depend largely upon the efforts of the pupils, rather than upon the efforts of the teachers. If the pupils attend with the determination to get knowledge from somewhere, they will get it readily enough: and if they get nothing more than a hint, or something that will lead them to where the information they desire can be obtained, very much good will result. One gentleman present spoke of the desirableness of issuing handbooks on manures. There are dozens of handbooks on manures—Munroe's, Johnson's, Storer's, Griffith's, and others.

THE GENERAL SECRETARY: You have to pay for them. (Laughter.)

PROFESSOR LOWRIE: At these evening classes the teacher might have these different books on the table, and I think a class whose members formed themselves into a sort of reading union could benefit themselves very considerably by taking say one of these books at a time, studying and discussing it chapter by chapter. It would be a great deal better for farmers' sons if, instead of forming literary societies, where you see papers delivered on Shakespeare as a dramatist—(laughter)—or on some other poet, they formed reading unions where they took up a systematic study of, for example, manures: because that would help them in everyday life, and show how best they can work their land and get a living out of the soil. (Applause.) The Stockport Branch proposes that students from the Agricultural College might be appointed to take up the work of the science classes under my direction. I would scarcely like to see a student do it. Supposing he is one of our best students. If he got into this work he might receive a salary of £80 or £90 from the Government. He would be, say at Riverton one day, at Kapunda another day, and at Gawler another day. He would probably get a notion that he knew all about agriculture—(laughter)—and he would stop working. So if a young man at that time of life were put in a position where he is not obliged to work, and work hard, it is very unfortunate for him; and I would be sorry to see our best students under-ake that class of work, for fear that they would settle down in a certain groove, and not continue their agricultural life. I think better results would be obtained if the younger men in the Education Department took up the work. In England, Scotland, and Ireland teachers in the country districts, if they desire, and if they taught these evening classes, can attend the School of Mines in London for a certain time and receive the benefits of the laboratory for agricultural chemistry. They get lectures in chemistry, and in addition are paid 30s. a week to keep them in London. They are given a sort of bonus for good results in scientific teaching. Now, I think that the Education

Department in this colony, without ever feeling it, could take a teacher, say from Mount Gambier, another from Riverton, and a third from Petersburg for the first year, send them to the Agricultural College, to enable them to teach the elementary principles of agriculture in the country districts. A man who is accustomed to study could obtain a lot of information in one year. At the Agricultural College he would see the whole cycle of farming operations; he would work in the laboratory, and altogether obtain sufficient information to qualify him to conduct agricultural science classes in the district from which he came. The Education Department would never miss him; the department could provide a *locum tenens*. If some such system of drawing teachers from different parts of the colony as that were adopted, you can see how in a few years classes would be established pretty well over the country. I really think that that would be a much better plan than to appoint a number of young men students from the institution with which I am connected. Besides, these country teachers have experience in teaching. Education, as much as farming, is a matter of experience. Unless you have worked at it, and for a considerable time, you do not know what it is. The young student from our institution at Roseworthy is not a teacher. He does not, nor can he be expected to, know how to communicate information. Every man should be thoroughly trained in the methods of imparting information to others, and I think if teachers from the country districts came to the Agricultural College and spent a year, or better still, two years in seeing and learning under Professor Perkins and myself, they could go back to their own districts and conduct classes with very great advantage. (Hear, hear.) At one time I thought that the Agricultural College work might be extended by sending out students as instructors, but after having fully debated the matter over in my own mind, I think it would probably be a misfortune for a youth to get such a billet. Everyone, I think, will agree with Mr. Cornish that the education on a farm is that of a lifetime. There is something for everyone to busy himself with watching what is taking place directly under his eye. Nineteen-twentieths of farming is but the application of the power of keen observation and smart business ability. If a man but simply read the lessons before him, and listen to the traditions of experience, he will come pretty near making the best out of the conditions of his land. (Applause.) One thing in which our farmers at the present time are somewhat at a loss is a knowledge of the chemistry of manures. The practical-sense farmer has not that knowledge, but if he has been well educated at school he has the power of accurate observation and the power of initiation. Those who visit the college next Monday will be able to see from experimental plots there exactly what the land wanted in particular manures. There are few eminent agriculturists living who would put stress upon the analysis of a soil as a means of ascertaining what is the capacity of that soil, or what manures it requires. You put an analysis of soil before me. I would not dare tell you what that soil would grow from the analysis, even though it was a good analysis. I would want to see the class of country, I would want to know the rainfall, and what weeds or timber were growing upon it. So you see you must not expect too much from a scientific education. A scientific education, though, would help a good practical man. What we want in South Australia is a place with some 15,000 or 20,000 acres, which will be thoroughly well managed, with a balance-sheet of all the operations properly set out and published, where young men can see the best methods of practice, the best implements used, and the most advanced means of taking out of the land what is in it. That is what we want more than scientific training. The great majority of our farmers require more business methods, less commission work, and more direct work—more unity amongst themselves, and less trusting to the agent. I hope the motion will result in classes being established in country districts; but I believe much more



good is likely to come through the teachers already in the districts being taught agriculture than through students at the college going round to teach. (Applause.)

The CHAIRMAN: Some of you will doubtless recollect that a few years ago a committee was appointed to consider something of the kind.

Mr. W. C. GRABBY: Four years ago.

The CHAIRMAN: Was it? It was intended that teachers should go to the Agricultural College during the vacation in December and January; that they should be taught for some time, and be able, after attending lectures and taking part in the farm work, to instruct to some extent, not merely the advanced scholars in their public schools, but subsequently science classes such as have been mentioned to-night. Of course we cannot lay too much stress upon the way in which the teacher has been brought up to teach. The Professor has told you already, and I know very well that it is not very easy for a man who has not been trained or brought up as a teacher to instil knowledge so easily as a teacher would do. Already we have done something, or at least the Government have made a commencement in establishing a secondary agricultural school in Adelaide, and secondary schools are to be established elsewhere, I believe. (Hear, hear). That is a way in which a great deal might be done, and it will no doubt be the means of leading young men eventually to the Agricultural College. The Professor says that the majority of our farmers are able to send their sons to the Agricultural College. That may be true or it may not; but it seems to me that all those who are sending them to other colleges are fully able to support them at the Agricultural College. What, after all, does the farmer in South Australia want? He wants a practical education, and not to learn how to dress himself—(laughter)—or to take a degree. (Hear, hear.) The practical education that farmers' sons would receive from some of these teachers would be very useful. The teacher at the secondary agricultural school in Adelaide is one of them. There is a gentleman at Templeton, I do not recollect his name, but I know he takes a great interest in agriculture. He goes in for experiments, and they are really worth looking at. I hope that the results of his work will be published. It may be said that there are teachers in the colony who will take up the matter, and will actually establish such classes if the young men themselves desire to attend. We know what is the case in Scotland and elsewhere. I may say that in Germany it was never intended that young men just leaving an agricultural station or college should go about as itinerant teachers. No; the Government have sent out men who were older and could command more respect, but who have certainly had a thorough education. It may be contended that the young men at the Roseworthy College have had the advantage of a thorough education, but they are too young. I agree entirely with the Professor. When they leave I should not like to see them taking up the teaching business. I should like to see them behind the plough at their fathers' holdings. (Applause.) I agree with almost everything Professor Lowrie has said. But it is for you, gentlemen, who know what you want and what you think is best for your sons, to speak on the subject. Please either support the scheme proposed by the Stockport Branch or move an amendment to it.

Mr. J. A. HASLAM, B.Sc. (Housemaster and Teacher of Science at the Roseworthy Agricultural College): I congratulate the Stockport Branch upon the ideas they have suggested, but I do not agree with the whole of the paper. The idea of having science classes in a community like this naturally is a most admirable one; but how those classes are to be run, what sciences are to be taught, are matters of detail, are important questions, which will take a lot of thinking out. One sentence in the paper runs: "We want more scientific education." Scientific education is a well-sounding phrase. It sounds tiptop when a man

can say that he has been "scientifically educated." But what does it mean? I am inclined to think that a boy who has been educated at a public school, and has proceeded from there to college and afterwards to the University, and reaches his third year at the University, then finds he is in a position to know a little about scientific subjects. The Stockport representatives propose that science classes should be started in various districts, and that farmers and their sons should attend to derive scientific education. I doubt whether they would get it. For one thing, the man who attends will probably not have had sufficient elementary education to enable him to grasp the scientific education. A man can be educated to a certain extent without having all this elementary scientific education. These science classes will be of no use whatever unless they are absolutely practical. I have had a good deal to do with teaching science, and the older I grow—I am not very old yet—I see that the only way to teach science is to teach it practically absolutely.

Professor LOWRIE: Hear, hear.

Mr. HASLAM: Supposing a man attending one of these science classes takes up a text-book; without a practical demonstration, it would be of little or no use to him. You know far more about the uses of bluestone on the farm than I do, and yet I can tell you more about its chemical qualities. But of what use is it to you to know that bluestone contains so many parts of copper sulphur, and oxygen? I have been at the Agricultural College for some time now. I knew practically nothing about practical agriculture when I went there, but through walking about the farm and seeing how things are done, and keeping my eyes open, I am now able to walk through a paddock and read it as I would a page in a book, and tell you the way in which it has been treated. The only way to test manures is to use them and find out their effects. What advantage is it to you as farmers to know the chemical composition of manures? It is of their practical use that you want to know. (Hear, hear.) I entirely agree with the Professor in the suggestions he threw out for conducting these classes. If a teacher were appointed to travel about from district to district and lecture to these classes, he would have to be fully equipped with an apparatus for every science subject he taught, or I venture to think his teaching would be useless. Other points have occurred to me, but Professor Lowrie has dealt fully with most of them, and with the assurance that I am heartily in sympathy with the idea of science classes being formed, I think I have said as much as I need. (Applause.)

Mr. D. B. STRIBLING (Stockport Branch): As a member of the Stockport Branch I have to thank you for giving the subject of agricultural science classes such a capital hearing this evening, notwithstanding that the discussion has been somewhat unfavorable. I do not think that the paper has fully conveyed the idea that we intended. When this matter was brought up it was suggested that our secretary should read a paper at the Bureau Congress. The establishment of these classes was proposed with the idea of bringing the young farmers more into touch with the Agricultural College, for there has been a want of sympathy—I don't know why—between the farmers and the college. Of late years the prejudice has almost broken down. This has been the case, at any rate, since the establishment of the Bureau and Branches, and since lectures have been given by Professor Lowrie and Professor Perkins. The idea was that if we could establish these science classes, and get half a dozen or more young fellows to attend each one of them and listen to the lectures, they would in a little while have ambition sufficient—if they could manage it—to enter the Agricultural College. These classes would act as feeders to the college. In the first place our Branch wrote to the Secretary of the Central Bureau, asking for advice in bringing our scheme forward. We got no information on the subject. The General Secretary said they did not

think the scheme was workable, but that they would be glad if we suggested a workable scheme. We formed a committee, and drew up what we considered to be a workable scheme. Some of us did not think, for instance, that a student of the college would be most suitable. The words "or other suitable person" should have been added to the clause. Although a majority of the speakers have clipped the wings of our proposal rather than favored it, I believe good will come out of it yet. I hope that the matter will not be overlooked altogether, and that the Central Bureau and the various Branches of the Bureau which have done so much good for the agricultural portion of South Australia will try and formulate a practical scheme. Professor Lowrie thinks that the average farmer can afford to send his sons to the Agricultural College. I know in my district it has been as much as a farmer could do to keep together and pay his rent, and in some instances farmers have found that they have had a big deficiency, compelling them to call a meeting of their creditors. I hope that the day is coming when the farmers of South Australia and the Agricultural College will be able to shake hands with each other. I believe that that day is fast approaching. (Applause.) We are undoubtedly reaping very great advantages from the existence of the college. Although these agricultural science classes may not be established on the lines suggested by our Branch, I hope that they will be formed, and that they will lead to good results. I am glad that you have received our proposal so well, and that you have discussed it so impartially.

The CHAIRMAN: I do not think that the proposition itself contains anything that even Professor Lowrie will object to, unless it is his own name. No one has exactly said that agricultural science classes would not be an advantage in the country. I think that every speaker has admitted that they would be an advantage. If you pass this resolution, then the Minister of Agriculture with, perhaps, the principal and teachers of the Agricultural College, and also the members of the Central Bureau, might have to work out a practical scheme.

The GENERAL SECRETARY: I would suggest that the word "elementary" be inserted before "agricultural science classes."

Mr. JAS. MURRAY: Before the resolution is put I should like to say a few words with respect to the Professor's remarks. The population here is very thin compared with that of Scotland; the opportunities are not as great here. I think that during his residence amongst us Professor Lowrie has come across the upper ten of the farmers, not the general run of them. (Laughter.) I know from experience that in the district from which I come there are very few farmers who can afford to send their sons to the Agricultural College. It is not only the £30 for one year, but if a farmer sends his son to Roseworthy it is for three years, unless, of course, the student passes an examination first and gets a scholarship. The country is handicapped. It is all very well to have a secondary school in Adelaide; farmers' sons cannot afford to come to Adelaide, notwithstanding the small fees. If the son is absent the farmer would have to pay for labor on the farm. We have to remember the keen competition of late years, and I ask, where are the farmers who can afford this? They are not about. (Hear, hear.) On the other hand, I do not think it has been contended that we want to make analytical chemists of the farmers. We know very well that to be an analytical chemist a man must serve a term for much longer than a mechanic has. But it is difficult to tell what will happen. These classes may be the means of bringing out a Baron von Liebig. (Laughter.)

Professor LOWRIE: Hear, hear.

Mr. MURRAY: The Stockport Branch would be quite agreeable to fall in with any workable scheme. We have not put our proposal down as hard and fast, and if Professor Lowrie, or anyone else, can bring forward a practical proposal, I feel sure that the Stockport Branch, or any other Branch, will be only too pleased to support it.

Professor LOWRIE: I am in full sympathy with the first part of the resolution, that is as to the desirability of establishing a system of science classes in the country districts. But I should like the words "under the supervision of Professor Lowrie" changed to "under the supervision of the Education Department." (Hear, hear.) The man who is in the position of Principal of the Agricultural College and Teacher of Agriculture has an abundance of work, and more than he can undertake, let alone additional duties. The work is sufficient in itself for any man, no matter how good he may be. I have to sacrifice my work now in order to do departmental work. I am here to-night and shall be here again to-morrow night. I had to spend the greater part of to-day working in my study when I would like to have been on the farm. I was preparing for my lecture at the congress to-morrow night. In addition to managing the farm and keeping myself abreast of the agricultural literature, one has to spend a certain time teaching, and I feel it would be asking too much to place these science classes under my supervision, seeing that already I have so much departmental work put upon me. The principals of the agricultural colleges in the other colonies have no departmental work of this nature. I will move that the words "under the supervision of Professor Lowrie" be struck out, with the view of substituting "under the supervision of an agriculturist in the Department of Agriculture."

Mr. MURRAY: I am agreeable to the amendment of the motion in that form.

Mr. C. H. HUSSEY (Port Elliot): When Professor Lowrie came out to South Australia I had a great deal to say about the Agricultural College. I do not know whether the Professor will remember that I mentioned to him on one occasion that I thought the best way to reach the agriculturists was to allow thoroughly practical men—such as I am quite satisfied Professor Lowrie is—to go throughout the country districts and give whatever information was necessary to the farmers. I considered that was the best method to benefit the agriculturists of South Australia. The small producers, those men who are struggling very hard and have as much as they can do to make both ends meet and get bread for their families, really cannot afford to send their sons to Roseworthy. I second the amendment moved by the Professor.

The amendment was carried, and the motion, in the following form, was unanimously agreed to:—"That the Congress of the Agricultural Bureau respectfully requests the Minister of Agriculture and Education to endeavor to establish a system of elementary agricultural science classes in the country districts under the supervision of an agriculturist of the Department of Agriculture."

### Portable Baling Presses.

Mr. H. A. GILES (Mount Pleasant Branch) read the following paper:—

For many years past I have been impressed with the necessity for making better use of straw instead of burning or allowing it to rot on the ground. As it is bulky, light, and slippery, the difficulty of carting and stacking, especially in windy weather, at a reasonable cost is no doubt a main reason why it is not more used for bedding, feeding, and shelter-sheds. Livery stable-keepers and dairymen are driven to use seaweed and sawdust for litter, where straw might and should be much more plentifully used, not only for the benefit and comfort of housed stock, but also to increase the supply of manure, which is becoming yearly of more appreciated value, as thousands of pounds' worth are annually imported; while in a season like the present much loss of life of valuable stock could have been prevented had the bulk of past seasons' straw been saved. Within my knowledge, for many years past the Police Department have paid £2 per ton for litter straw, while at half that cost it should often leave the grower a profit; and the consideration of the subject should be of more than passing importance to our farming community. For some years past our Government has been offering a substantial prize for a stone-gathering machine, and were such a prize offered for the machine now under consideration inventors might succeed in inventing a suitable machine. We now have binders which cut and sheave to a certain size, tied with one band. Provide a similar machine to cut and tie with three bands,

sheaves square if possible instead of round, say ten times larger, with appliance for cutting off each end of sheaf, and we then have a lot of straw in small compass suitable for loading and stacking even in windy weather, or for building walls for shelter for paddocked stock, or sides of sheds, and in time of need available for fodder. The inventors who provide us now so commonly with the binder and the sowing machine should be able to make such machines. Another plan would be to cut and rake, or use collectors, to gather straw into large rows, and have a machine on wheels, into which straw would be pitched from the rows, and trodden into a square bale box, say 12ft. long, 2ft. wide, 3ft. deep, while above sides of such box a wider rack-shaped frame would receive straw and enable it more easily to slip down to fill the bale box, which, when full to its sides, should be provided with a strong loose cover like a woolpress. Securely fixed on either side of bottom frame-timbers should be chain fixings for ratchet presses, so that one man on each side could press contents to the required tightness, secure with nine hoopiron bands, forming one bale 12ft. long by 2ft. wide, by about 30in. deep; the strain is then removed, and cover, and with a crosscut saw, similar to the ordinary tooth hay-knife, cut off the two ends, and two more such cuts 4ft. apart would give three bales of straw of convenient size for carting on trolleys, stacking, or building. On one side of press, between top and bottom frame-timber, should be a door full length, similar to railway trucks, which, by removing bolts, would fall down and liberate the bales as in woolpresses, and machine would then move on to be again filled. The work should be done immediately after stripping, when days are long, ground hard, and the straw of good quality, by one horse and two men, so that the cost per ton should not be great. In conclusion, I trust others will think over my suggestions; and should the matter have the approval of the Bureau, and that body approach our Government with a recommendation for a substantial prize to be offered under the auspices of our Royal A., H., & F. Society, I have no doubt an efficient machine would result, of general utility to all farmers.

**THE GENERAL SECRETARY:** Time after time, as agricultural editor of the *Observer*, as editor of the *Garden and Field*, and as editor of the *Journal* of the Agricultural Bureau, I have mentioned the American continuous baling press, into which two men and a boy can pile straw as fast as they like; as rapidly as a man can tie them the bales are made up. There are two of these machines owned by Messrs. Clutterbuck Brothers. They have been exhibited at Shows here, and notwithstanding all the publicity that has been given them, an invention appears now to be wanted for a cut cross saw, when this continuous baling press will do all the work. In America and Victoria they make buildings of these bales. It is possible to make ensilage stacks with them. The bales are just the ordinary size of the hay bale. They are built up with walls of about 9ft. or 10ft. high, and if necessary, a galvanized iron roof can be put over them. In times of scarcity of feed they pull them down and use them. I hope to give some illustrations of these in the next *Journal* of the Bureau.

**MR. PHILLIS (Mount Pleasant):** Our idea is to have a portable baling press, which you can have in the paddock, simply press the stuff in rows on the ground and take your bales home.

**THE GENERAL SECRETARY:** The machines of which I speak are portable.

**MR. PHILLIS:** You could stack up these bales too and keep them for years.

**THE GENERAL SECRETARY:** The machines I speak of are portable, and the horseworks form part of the machine, but there is no trouble about them.

**PROFESSOR LOWRIE:** I would support Mr. Giles to the extent that some machine convenient for the baling of straw is very desirable in South Australia. I see one of my students sitting in the room. He had to turn an old sort of screw. We have been doing this for years. Students as well as teachers would like to have one of these continuous presses. That machine in the show last year cost £187. To me it seems that there was not the material in the machine to justify such a price. (Hear, hear.) No doubt the patents and the import duty make it so costly. If by some means or other, by offering a prize say, for a cheap machine which can be brought out whereby our farmers can not only bale their straw but bale their hay, it would certainly be a lasting benefit to this colony. (Hear, hear.) Men up country, if they could put up straw or hay

in a small compass and send it down, would find they had a wide market. I am rather inclined to support Mr. Giles's paper, or the recommendation to the Government to offer some encouragement to mechanics to work out a suitable straw or hay baling press to meet our South Australian conditions. It was said that the Government are paying £2 per ton for straw for the police. This year the Government are paying £2 10s. or £2 15s., and I do not think they have ever paid less than £1 17s., and if we could get straw into Adelaide by some means of baling it would probably pay the expense of binding the crop, carting the straw, and paying for the threshing.

Mr. H. A. GILES: I move—"That the Government be requested to offer a prize for the invention of a portable baling press." I see the advantages of a portable press. If the straw could be handled in the paddock instead of being carted away, it would be much easier. In the Hills districts we have so many windy days that we cannot work half the time, and sometimes not so long as that.

Professor LOWRIE: I second Mr. Giles's proposition.

Mr. GILES consented to this motion being put in the following form:—"That the Government be requested to offer a prize for the invention of a straw or hay baling machine, portable or otherwise."

The motion so put was carried unanimously.

### How to Produce our own Fertilisers.

The GENERAL SECRETARY read a short paper by Mr. H. Napper, Johnsburg Branch, on this subject, upon which there was no discussion.

#### FOURTH SESSION.—THURSDAY, SEPTEMBER 9.

The Chairman took the chair at 10 a.m.

### The Value of Fruit as a Food, and the Making of Cider and Fruit Wines.

The CHAIRMAN (Mr. F. E. H. W. Krichauff) read the following paper:—

There are three papers in the latest *Journal of the Royal Horticultural Society*, England, dealing with these questions, from which I make some extracts, and also from a paper by Professor Dr. Nessler. Fruit has a food value that has never been overrated, generally underrated, and it is, even in this warm climate, with a large section of this carnivorous community, sadly neglected. A learned professor, who lived for months on a few pence a day in London, said—"Give me good bread and pure water, and I have the necessities of life; add an apple, and I have its luxuries." And as regards the solid food, apples, pears, and apricots contain 2ozs. of food in the pound, while grapes contain 3ozs., cherries 2½ozs., and bananas 4½ozs. in the pound, and the several nuts 14½ozs., dried apples, raisins, and dates 11ozs., figs 9½ozs., and prunes 11½ozs. Preconceived notions of the value of foodstuffs, which our immigrants brought from their birthplaces, and their offspring accepted as gospel, make it necessary to educate them from a hygienic, dietetic, and economic view, to a revision of their mode of living. Flesh foods form the principal diet with probably more than half our population, while fruit finds too often no sale, and rots on or under the trees. We have encouraged fruit-growing, but not also the consumption of it. We may blame the growers for not forming co-operative societies and depôts, from which the consumer can, at all times, and not merely after midnight in the markets, obtain fruit at reasonable rates, without the intervention of middlemen. The advantages to both producers and consumers are undeniable. How well such societies thrive in the United States, if properly constituted! In Germany there are now many, and one fruit-selling co-operative society at Obernburg, on the River Main, disposed, in 1896, produce which realised £25,000. It is unfortunate if there are no leaders who will learn in that direction, for I am afraid the only gardeners' co-operative society here should do far more. To most of us the use of the tomato as food was unknown while children. What large quantities are now consumed, although they contain only 1oz. of solid food in the pound, and it is a surprise to me that other fruits have not made the same progress in public estimation. And why do not men from Herefordshire, Devonshire, Würtemberg,

and elsewhere, who valued, at home, good cider and perry, make it here, where so many complaints are made about the difficulty of finding a market for anything but the very finest fruit. Their taste, I presume, has not entirely altered, and a demand for such a wholesome, refreshing drink in our hot country is sure to spring up if anything like a good article is made free from harshness, tartness, or excessive astringency. I had no opportunity to obtain any late figures of any cider factory in England, but that of Freysohn Brothers, at Frankfurt-on-the-Main, is known over many countries, and certainly one of the best. Usually—and also in 1896—about 54,000 cwt. of apples are purchased, from which two million litres (1½ pts.) of cider are made. After being washed the apples are lifted by steam into the mill, from which they are passed into eighteen presses of hydraulic or other patterns. Four or five persons attend each of them. The must is carried by means of leather pipes into subterranean fermenting vats in a wide room, 30 ft. underground, and warm, so as to quicken fermentation. A winding staircase runs around the lift, which is used for removing the big casks to the surface. By this staircase you go still 60 ft. deeper into large cellars, cut out of the limestone, where you find about 1,000 big casks containing the finest cider, holding from 1,100 litres to 1,500 litres each. These are marked with such names as “Marcobrunn,” “Nierstein,” and other well-known Rhenish wines, from which pure cultures have been used for the fermentation of the cider, notwithstanding their high price, and thus the cider got its very fine taste and aroma. Considerable quantities of cider have, however, to be stored in other cellars for want of room. A winemaker surely can make cider, the process being so similar, although the fermentation may require special attention and knowledge how to regulate it. The low alcoholic strength is another great advantage in a summer drink, as cider never contains as much as 10 per cent., mostly no more than 4 per cent., if the fermentation has been stopped before the full amount of alcohol has been developed. The malic acid in cider is a health-giving product, and recommended against gout and rheumatism, stone and gravel in the bladder, while the tartaric acid in wine forms with lime precipitates, which are said to be the principal causes of these disorders. If the Agricultural and Horticultural Society, or our Government, were to offer for some years substantial prizes for the best cider or perry manufactured in South Australia an industry might be encouraged, which would utilise produce now wasted. Of course we cannot hope to export cider to England, although there seems to be an unlimited demand for a good quality at low prices. but we might find a market in some of the islands in the tropics, if the cider is not made from refuse apples of all varieties, or sweet apples only, or even those that are unripe. Many of the apples used for culinary purposes are also good for cider, but it may be necessary to plant special varieties, too harsh and astringent for table use, to supply to the cider the chief characteristic of good cider—its astringency. Their names are Cherry Hereford, Red Cowarne, Cummy, Hereford or Norman, Handsome, Joehy Crab, Kingston Black, Royal Wilding, Strawberry Hereford, White Bache, and others more lately introduced into England from Normandy. Most rich, high-flavored, and sweet apples make good cider, but dessert apples are worth more than to make cider with, although even in England cidemakers state that they have used Ribston Pippins, Newtown Pippins, and the like.

The average must of fruit contains from 4 per cent. to 10 per cent. of sugar; therefore, in any case, considerably less than the must of grapes. During the fermentation we receive from 10 parts of sugar 4·8 parts of alcohol, and as a considerable quantity of water is generally added to the must of fruit, the percentage of spirit is very small in such beverages. It is not so easy to keep them, or from changing the sugar into slime instead of alcohol, as the fermentation in the must of fruit is slow. After months, or even in the next summer, we find still large quantities of sugar, perhaps 4 per cent. or more, in it. The carbonate which rises during this very slow fermentation is very refreshing in cider and perry, while, if the must were to ferment only a few days, they would be quite insipid. We can take it, however, for granted that no beverage which does not contain at least 5 per cent. to 6 per cent. of its volume in alcohol will keep several years. If you desire this the must should contain 8 per cent. to 9·6 per cent. of sugar. Only the best of apples and pears contain from 8 per cent. to 11 per cent., inferior only from 4 per cent. to 6 per cent. of sugar. In a lecture by Prof. Dr. Nessler, of Karlsruhe, held in June, 1896, the following directions are given:—“The fruit should be ripe to make the fruit-wine keep better. Hard pears and very sour apples, if sound and not injured, should be kept some time to mature after picking. Worm-eaten or mouldy fruit, after crushing, should be pressed at once to prevent, as much as possible, incipient fermentation in the pulp, which would give a bad taste and make the must muddy. Sound fruit, after being crushed, may remain two or three days if the pulp is properly kept under the must by means of a perforated false head, loaded with some clean stones, to prevent the formation of acetic acid, and the temperature is low enough. You will obtain more must if thus kept, the fermentation is better, and the fruit-wine clearer. If there is not enough sap in the fruit pour some water on it. In many cases the addition of water to the pulp, after the first pressing and stirring the

pulp, is not objectionable, if pressed after twenty-four hours; but the pulp must be put at once into a cask and covered with water to prevent acidity. There should be no iron tools used, nor any iron on the mills and presses, or the fruit-wine will become black. Many pears and apples contain too little acid. This you can supply through red or white currants. You add to their sap 150g. to 200g. of sugar per litre (about 1½ pts.), let it ferment, and keep it in a well-bunged cask or stone bottle until required. Another way is to add per hectolitre from 100g. to 150g. of cream of tartar. Fifteen litres to twenty litres of the juice of currants to must of pears, for instance, would increase acidity in a hectolitre (22galls.): 4g. to 5g. in the litre. The must of fruit should be filled in a well-cleaned cask, which must not be sulphured again or it would prevent the after fermentation. In many localities the casks are quite filled, so as to allow the rising muck to flow over, and this is very good where the fruit was mouldy. For sound fruit this is not advisable, as much ferment flows over which would help to clear the wine. To draw off the fruit-wine at the right time is very important, unless the fruit was first class, no water added, and the cellar very good. It is best, however, to remove the ferment as soon as it has settled, draw the fruit-wine into a cask which has been but little sulphured. If no further fermentation takes place you may in that case add from 2lbs. to 4lbs. of sugar, or 3lbs. to 6lbs. of cut up raisins to a hectolitre, unless the wine smells of vinegar. Use at first sandbags on the bungholes, and afterwards tubes with glycerine as soon as the fermentation has slackened, also on the casks from which you tap. Dr. Nessler speaks of three kinds of cider, of which the second and third seem to me pretty well alike, viz., summer must and must for sale. Winter must is the drink made from poor, or partially rotten, or damaged fruit, to which much water has been added and no sugar. There is no necessity to draw it off the lees, as it is not expected to keep more than a few months. Summer must is made of sound fruit, which must contain an unfermented must with 9 per cent. to 10 per cent. of sugar, or 55° to 60° oechsle. If it does not contain quite so much, add for every 5° 2lbs. of sugar per 22galls. You may add water, but in that case it requires 24lbs. of sugar for each hectolitre of water used, or after the fermentation is over you may add spirits of wine, nearly one litre for every 3lbs. of sugar, but sugar is preferable. The summer must and must for sale should be drawn off the lees and kept in a good cellar, so as to keep during the summer. At Geisenheim they prepare pure cultures of ferments for fruit-wines and use no other, and thus ensure a far better and always the same taste and aroma. If fermentation does not go on very well you may add 20g. sal ammoniac (salmiak), draw afterwards off the lees and put the wine into a cask, which is not too much sulphured. Mr. Metzger stated, in a long report on the fruit trees of Wurttemberg, that the farmers and laborers use 300 litres of water to 6cwts. of fruit, and sometimes even more water, and it is a chief question with them to procure a sufficient quantity of fruit-wine. The use of it is not only a healthy drink, but actually contains much nourishment. Hundreds of laborers take their bread and about three litres of fruit-wine, much of which is made from berries, to their work and live during the day upon this, with perhaps a slice of cheese, until they return home in the evening.

Our taste has been formed from habit, and surely it is a great advantage, if we can gradually adapt it to use an article for food and drink, which is granted to us in South Australia in such profusion, and at the same time so specially fit for our hot climate. The value of the apple as a food was already recognised in the Bible and in ever so many fables and fairy tales. In the mythology of Germany the World-Ash had as its fruit the apple, which was always considered as good as a family doctor. It contains in its dry substance 26 per cent. of soda, and the strawberry even 29 per cent., which binds and carries away the carbon. The gooseberry contains 12 per cent., the plum 10 per cent., the grape 11 per cent., the strawberry 14½ per cent. of lime, which is required for the formation of bones. Of iron for the blood, 6 per cent. is contained in the strawberry, 3½ per cent. in the plum, and 4½ per cent. in the gooseberry. No wonder, if children are so greedy after all these and other fruits, which are so refreshing and contain so many nourishing salts. Fresh or dry fruit and jams should always be on the table, instead of only albuminous food in the shape of meat, &c. There was a time in Germany when nobody was allowed to marry before he had planted a number of fruit trees, but, without such compulsion and further amplification, I hope you will notice my well-meant exhortation, viz.: You South Australians living so much on albuminous, starchy food, and that in a hot climate, contrive to bring nourishing fruit-salts into your blood.

The *American Cider and Vinegar Maker*, of June 12th, 1897, contains interesting particulars of a novelty in cider making. A dozen or more tubes are arranged in a circle, which are provided with a perforated false bottom. Each tub is filled up to three-fourths with apples cut into small angular pieces, neither too large, nor too small or thin. A tank containing a steam coil to keep water to 75° or 80° F. is placed at such an elevation that the water may flow gently by means of an indiarubber hose into tub No. 1, extracting a portion of the juice, and, after passing through the perforated bottom, flows



by an exit hose into the second and other tubs, so that the water becomes practically saturated with apple extract. From 90 to 95 per cent. of the saccharine matter is easily obtainable, against 60 to 70 per cent. by means of crushing mills and presses. The fluid is also clearer, clarifies easily, and keeps better. Although this extracting process is imitating that for the sugar beet, I cannot understand why the apples should be cut into "angular" pieces and "not too small or thin," while sugar beets are sliced into chips of 1 mm. thickness, which can far more quickly leach out the sugary juice. Another point is, that the water is to be only from 75 to 80° F., while it is heated for beet to 130°. I should also like to know how the cutting is done. If with steel knives, I am afraid the cider will be somewhat discoloured. To make cider vinegar, which is considered very wholesome and has a beneficial effect upon the digestion, the best apples are selected. The cider must be exposed to the air as much as possible for two or three days by running from one vat to another very slowly over a board with a shallow groove in it, until the oxygen of the air has turned the sugar into vinegar. A bill to protect consumers of vinegar against adulteration of cider and of other vinegars is introduced in the Nebraska Legislature proposing that no vinegar shall contain less than 4 per cent. by weight of absolute acetic acid. Utah also forbids the sale of vinegar made from commercial acetic acid.

I believe Mr. Heyneman is present. He will be able to give some explanation with regard to cider and vinegar making.

Mr. G. C. HEYNEMAN made a statement describing the manufacture of vinegar. In the course of his remarks he said: The vinegar in this colony is mostly made from malt or from fruit, but a large quantity is not vinegar at all. It is adulterated and consists of acetic acid diluted with water, the acid being obtained from wood. In a recent case it was stated that much of the vinegar consumed in the colony was nothing but acetic acid colored with burnt sugar, and the Government has been asked to prevent the selling of this stuff as vinegar. Those who sell it can call it vinegar if they like—wood vinegar or any other vinegar—but they must not call it real vinegar. There is no better vinegar in the world than that manufactured from cider. The great bulk of the American vinegar is nothing else but cider vinegar. America labored under the same difficulty as we now labor under here, and the different states passed laws to prevent the sale of the stuff. The Chairman has explained the best apples to use for vinegar. The best apples which I have seen in this colony for cider-making is a large green variety grown at Mount Gambier.

THE GENERAL SECRETARY: I was in hopes that Mr. Hannaford would be present and explain to us how he had made cider vinegar this year. He has left a sample at the Bureau office, and Mr. Heyneman says it is very good. Mr. Hannaford has made about 1,000 galls. this past year, and he thinks it will pay well. The quantity of vinegar he gets from a bushel of apples would give him a higher price than if he sold the apples in the market at low rates. The advantage is that he can use all slightly deformed or specked apples, or such as he would not regard first class. The Chairman's address I consider a valuable one. It gives hints which ought to powerfully impress the mind of every person in South Australia. We do not use anything like enough fruit as food in this climate. We consume a great deal too much meat, and it would be far better if we used more fresh fruit and vegetables, and also dispensed with that horrible habit on the Australian continent of drinking spirits—the very worst thing we can do in a hot climate. (Hear, hear.) If anyone must have intoxicating drinks, let him take our wholesome and nourishing wine, which, whether made from grapes or apples, is a wholesome and healthful beverage taken in moderation. I think it is rather doubtful whether we can make cider in this hot climate under existing and ordinary circumstances. They can make cider in the South-East with greater hopes of success than we can in this warmer part northwards. Several attempts have been made by cider makers from Hereford and other places in England, including the late Mr. Chas. Giles, of Grove Hill, who had been in the habit of making cider at home. He made 40 hhd. in a most approved style, taking the greatest care; but he was

not able to sell it, and kept it for a long time as vinegar. I think he eventually emptied it away. You will remember a great to-do was made on account of the cider made by Signor P. Villanis, C.E., for the late Sir R. D. Ross, at Highercombe. It was fairly good stuff. I had some of it. I drank some twice, and was very ill afterwards. (Laughter.) I did not drink much of it afterwards. I gave three or four bottles of it to some men who were digging a cellar. They supposed it was champagne. They did not know the difference. It did not hurt them; they were stronger than I was. (Laughter.) It was in champagne bottles, and fizzed. (Laughter.) I think our climate is too hot. Apples are more difficult to deal with than grapes, because they contain a good deal of albuminous matter. At any rate cider ferments very rapidly, and there is a great deal of matter left in the liquid which will re ferment. But if we get a very deep cellar, say 20ft down, it is quite possible that we could secure an even temperature. Our Chairman spoke of using red and white currant juice. I would like the Chairman to tell us where we would get this juice. (Laughter.) The Chairman gave the experience in Europe. The conditions prevailing in Europe might be very satisfactory to cider and fruit wines, but they would hardly prevail here.

Mr. HEYNEMAN: Can you not substitute honey?

The GENERAL SECRETARY: Yes; for some things. We could make honey vinegar.

Mr. J. LAWRIE: You have told us your objections to wood acetic acid being sold as vinegar. Which is the more nutritious?

Mr. HEYNEMAN: Vinegar is nutritious; acetic acid from wood is not.

Mr. W. C. GRASBY: The difference between natural fermented vinegar and acetic acid and water would correspond to the difference between a mixture of water and spirits of wine and natural wine.

Mr. J. JENNINGS (Norton's Summit): Mr. Chairman, you say "Only the best of apples and pears contain from 8 per cent. to 11 per cent., and inferior only from 4 per cent. to 6 per cent. of sugar." I presume that is the European test. Would it be the same here? Would it be more or less?

The CHAIRMAN: I cannot say; probably more.

### Fruit Export and Nomenclature.

Mr. G. QUINN, the Inspector of Fruit, exhibited on the table four sample cases for the export of fruit.

A MEMBER: Quite a timber yard.

Mr. QUINN: I do not think there is any need for an apology for this timber yard, as someone has suggested. All those who export oranges and apples know very well that we have not yet arrived at perfection as regards the size of the case for use. (Hear, hear.) I think it is a point very much disputed, but I hope to hear the opinions on the subject of those present who have exported largely. At the conference of fruitgrowers recently held in Brisbane, this subject came up for discussion, and a sub-committee was appointed to try and thresh out the question of a case suitable for packing all types of fruit. The committee recommended in favor of the Peacock case, which is largely used by the Tasmanians, a specimen of which I have here. As regards the case we are using at present for export in this colony, all through the season I have heard complaints from exporters to the effect that it was unsuitable, and that it was wasteful of space for packing large-sized fruits. We can squeeze oranges a little more than apples, but it is not advisable to squeeze them out of shape. This case—our export case, I mean—measures outside 28in. in length, 13in. in depth, and 9in. in width. The outside cubic measurement is 1ft. 10½in. The inside capacity is 1ft. 5½in. This would hold about sixty large-sized oranges or apples of about 3½in. diameter, and about 166 of the smallest grade—that is,

about 2½ in. in diameter. It would take twenty-one cases to make up the ton, and at 85s., the price charged for insulated space in the ocean steamer to England, the freight would be 4s. 1d. per case. For the packing of the 2½ in. and 3 in. diameter fruits this case answers very well. The smaller size can be packed in regular rows, and the larger size in alternate rows. The Peacock case, in Tasmanian hardwood, measures on the outside 10 in. x 15 in. x 20 in. Its dimensions are almost the same as those of the kerosine case, but the Peacock case will hold more fruit. The case being made of our softer woods it would be necessary to use thicker boards than in Tasmania. I have stood upon this case which you see before you without in the least damaging the contents. In our soft woods it would be necessary to use thicker timber for the sides, making the dimensions of the case 10½ in. wide, 15 in. deep, and 20 in. long; the outside cubic measurement 1 ft. 9½ in., and the inside capacity 1 ft. 4½ in., a little less than our present export case. The Peacock case lends itself so well to packing fruit that there is absolutely no waste space in it. This case would hold seventy-five large fruits, while our export case would contain only about sixty large fruits, though its cubic capacity is an inch more. The question as to whether fruit is more likely to be damaged by pressing against each other than by pressing against the partition is one upon which I should like to hear opinions from gentlemen at this Congress. We can pack twenty-one and thirty-three thirty-fifths Peacock cases to the ton of space. This at 85s. per ton would make it 4s. ½ d. per case. Though you give the buyer more fruit than in the other case, you see it can be sent for less. Mr. L. M. Shoo-bridge, of Tasmania, one of the largest exporters of apples from any of the Colonies, told us at the Conference that he started with a prejudice against the Peacock case, but that he used it all through last year, and was satisfied that it was a more economical case than the longer one used by the Tasmanians formerly, the outside measurement of which is 28 in. long, 15 in. deep, and 7½ in. wide. Then I have here the Florida orange case, which is 27 in. long, 13 in. wide, and 13 in. deep. This case also lends itself well to packing oranges. I tried it yesterday. It seems to pack almost any size well, but it appears to be rather weighty. We find it measures 2 ft. 7 in. outside and 2 ft. inside. For the larger oranges it does not seem to me to have the advantages of the Peacock case. It will hold only seventy-two of 3½ in. diameter oranges and there would be only fifteen cases to the ton, and at our present prices the cost would be 5s. 8d. per case to ship. I think it is hardly suitable. Then there is another case. This measures 24 in. long, 11½ in. wide, and, with a partition in the middle, making each compartment 10½ in. wide, 10½ in. long, and 13 in. deep. It holds seventy-two oranges 3½ in. diameter, and the fruit will pack in very firmly and nicely. This case is over 2 ft. outside measurement, and that is the drawback, because we have been accustomed to work 2 ft. in the ship. One of the growers present to-day adopted a case which struck me as being a better one than this for large oranges. I hope he will be able to give us the results of his experience with it. There is not the least doubt that we must have a different case for large-sized fruits. We cannot pack different sizes in one particular size case. I should like to have the opinions of persons interested in the export of fruit, so that before the next export season we shall be able to adopt some uniform size.

**THE GENERAL SECRETARY:** The Peacock case has no divisions?

**MR. QUINN:** No. As a matter of stability this case does not require a division, and consequently packs better; but I am somewhat in doubt if a heavy body of fruit would carry better in contact with itself than if separated by partitions. The workmen can handle the Peacock case for a longer time, or rather become less fatigued, owing to its being more convenient.

**THE CHAIRMAN:** Did the Conference at Brisbane recommend a uniform case for the Australian colonies?

Mr. QUINN: A sub-committee was appointed by the Conference to thresh out the question. Two representatives of this colony are here this morning. The committee recommended the Peacock case, and the Conference, by twenty-six votes to seven, decided that this was really the best for Australian purposes. It is economical for stowage. The Tasmanians claim that one of the advantages for this case was that the wood from which it was manufactured was easily procurable. That seems to me to be a drawback for us. In Tasmania, where they have hardwood, that case could be landed in the orchard for a trifle under sixpence. Here, according to the present prices for our soft timbers, it would cost over a shilling. The boards would have to be wider. But the timber merchants are beginning to cut the prices somewhat, and I hope that before long we shall get our cases much cheaper.

The GENERAL SECRETARY: There are cleats on the sides of this case to allow of the passage of the air between the cases.

Mr. QUINN: The recommendation of our department for several years has been in favor of cleats.

The GENERAL SECRETARY: In regard to the divisions it should be borne in mind that in packing, if you have sixteen corners to fill, it takes longer than if you have only eight.

Mr. QUINN: In Tasmania the cases of hardwood are made  $\frac{1}{2}$  in. at the sides, and  $\frac{1}{2}$  in. at the ends, and the Tasmanians claim that they can put twenty-three cases to the ton in the steamer, while with our soft wood we can put only twenty-one.

Mr. E. J. B. EDDY (late manager of the Produce Export branch of the Agricultural Department): In Tasmania they have no cleats fastened on the sides of the case. This is owing to the shipping companies in Tasmania providing all the dunnage. If this is continued in Tasmania and Victoria, I think they should provide them for this colony. They do not refuse to provide them, but we have adopted this system. We get twenty-one cases to the ton, and in Tasmania they get twenty-three cases.

Mr. QUINN: I doubt if there is a great advantage in putting so many cases to the ton. I believe it would be better to have a case or two less to the ton, and devote the remaining space to ventilation.

Mr. EDDY: They calculate you the size of a case, and allow so much space in the steamer, and if they do not pack a certain number per ton, as they should according to their space, the loss is with the shipping company, not with the shipper.

The CHAIRMAN: I understand that Mr. Sage proposed to open a discussion on the nomenclature of apples. We might very well proceed with that subject at this stage.

Mr. W. SAGE (Angaston): The question which I wish to particularly bring before the Congress this morning is the marking of cases and the naming of varieties of apples. There are a number of shippers of fruit here, and they will agree with me when I say that different varieties have been shipped under the same name. This causes difficulty and trouble for us in the London market. We see by the report from Mr. Young in London that the Cleopatra, or Ortley, apple has been forwarded to England under three names—New York Pippin, Pomeroy, and Cleopatra. Seeing that the market in London promises to be of great value to us, I think it would be well to start this business on as good a basis as possible, and endeavor to pack our cases in as uniform a way as possible. I therefore think it is very desirable that one of the first things we should do is to agree upon some name for each variety. As a shipper of apples from Angaston I have been accustomed to look upon the Cleopatra as being the best variety, and I am naturally predisposed to that name. But I am quite willing to abide by any name that may be agreed upon by the majority.

(Hear, hear.) You can understand the difficulty that might arise through people seeing the apple sold as Cleopatra this year and the same variety disposed of say next year or the same season under another name. Of course that would lead to confusion, and make it all the more difficult for us to obtain a ready sale for our fruit. We packed in two sizes of cases last year—one like a case on the table and a narrower one. We found the narrower size unsuitable for packing large fruit, owing to the difficulty that Mr. Quinn spoke of, namely, to get the larger-size apple to lie evenly across the case. I am of opinion that the Peacock case, which is exhibited by Mr. Quinn, would pack more easily and economise space. It lends itself especially to packing large fruit. The expense of sending fruit to England is very heavy, and it is desirable that we should ship only the best varieties. If we could agree upon the size of case and the names for varieties, and also decide upon a uniform grade for packing, I feel sure that it would greatly enhance the reputation for South Australian apples in England. I noticed last year that a consignment of Tasmanian apples to England was put upon the market in a frozen condition. They were Australian apples, and the effect of that shipment was to decrease the prices we obtained for our apples. I think that the same thing would happen if our shipments were uneven, for they would tend to lower the prices received by our exporters as a whole. The returns last year were not so satisfactory as I had hoped, and not so good as in the two previous years. Our net return was something like 2s. 9d. to 3s. per case. Still, that was better than we could have obtained by selling the fruit in the colony. (Applause.)

The CHAIRMAN: In an American agricultural paper for June something is said about the apple crop for the present year, and they are afraid that it will not be an over-abundant one. An apple crop is never or rarely alike two years following. If you have an over-abundant crop one year, as a rule, you should not expect as full a crop the next season. I recollect trees that bore one year not bearing at all the next year. [The Chairman read an extract to show that in all probability the export of apples from America would be comparatively small.]

Mr. J. DALL: I would like to ask if the prices for shipment in the different colonies are uniform. Our expenses in connection with exporting apples are far too high. I sent 100 cases this year and they realised within a shilling or two of £50. The expenses took nearly all the money. I think I got 2s. 6d. or 2s. 9d. a case. The case I packed in was a tall one, and I had to leave out all the finest apples and send middling ones, simply because I could not get in the large ones. Well, the effect of that was to a very great extent to spoil the rest of the sample left behind. It would be much better if a case for the large apples were selected. I have noticed two or three statements in the press from Mr. Young to the effect that South Australian apples realised from 3s. to 5s. per case more than the apples from the other colonies that were sent to England. If that be so, the other colonies must have sent their fruit for nothing. (Laughter.)

Mr. QUINN: South Australia is, undoubtedly, a most costly colony as regards the shipping of fruit. We have to lighter it to the steamship. In Victoria the fruit is run down to Williamstown pier and placed in the cooling chamber; and in Tasmania much the same thing is done. The fruit-cases are more costly here than in the other colonies. Then again, the cost of the wrapping-paper here is greater than in the other colonies. If I had known sooner that this discussion was coming on I would have obtained the prices from the eastern colonies. But I hope to be able to have them published in the *Journal of Agriculture*. (Hear, hear.)

Mr. W. C. GRASBY (Central Branch): As many of you are doubtless aware I have devoted much attention to the subject for some years past. But I will

not say much about the relative advantages of the different sizes of cases—there are strong advocates for each—but if the departments in the various colonies are going to adopt a case because of its all-round advantages, then, for the sake of uniformity, it would be advisable for the individual to agree to it too, for he will probably gain in the long run. Each case has its strong and weak points. The Peacock case will be objected to because it is dumpy. This may be a disadvantage for apples but not for citrus fruits. Think of the hundreds of thousands of cases of lemons and oranges sent from Sicily and Spain, and other parts of the Mediterranean, to America and Australia in cases each of the two divisions of which is about as large as this. It is constructed of beechwood from a  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in thickness. When packed, the fruit stands out right over the top of the case,  $\frac{1}{2}$  in. or so above the edge at the ends and 3 in. in the middle. This thin beechwood is nailed over by means of willow battens pressed down. The wood is so thin and the pressure is so great that no nail would hold in the wood. This case holds from 320 to 400 lemons. Six or seven of these cases are put in the ship's slings at the same time. I have watched the loading of steamers in Sicily and at Naples. The cases are carried down into the hold bumping against the side—with a tremendous weight like that a bump or jar is unavoidable—and one would think that the fruit would be bruised. Yet these lemons go to America and come out to Australia, and are in first-class condition when we receive them. Therefore it does not seem to me that there need be any fear of the case you have here damaging the fruit in the way suggested. That, of course, is only an opinion. The real test is experience. When we come to apples we come to disagreement as to whether we should have the same cases. In Sicily they have as many as 20 packers in one packing-house, and boys, girls, and men are engaged. I visited one place where there were eighty girls wrapping and expert packers putting the fruit in the cases. There is no doubt that very much more of the success of the export of fruit depends upon the care and expertness in packing than we are even beginning to admit. The packing of lemons and oranges has been brought to such perfection in Sicily. Some who can hardly say a good word for a Sicilian in some respects readily admits that he carries out the handling and packing of fruit in a way that not even the Americans have begun to do. I saw Sicilian lemons and oranges in Covent Gardens in conjunction with the Californian, and all I can say is that the Californians have got much to learn from the Sicilians. And we, too, have a lot to learn yet. The fruit business requires a great deal of experience. The Sicilian packers carry out the work with great smartness, and, although the cases are bumped about, the lemons stand the voyage well. As to the point raised concerning our conditions of shipping compared with those of the other colonies, I once saw about 13,000 cases of apples put into a vessel in Tasmania, and from the time the case was lifted out of the trolley or dray on to the ship it was not touched, except to steady and conduct it into the hold. One of the large Orient liners came to the wharf, lying in some 36 ft. of water. The case was put on the slide and just guided by a man down into the vessel to be packed in the cool chamber. Compare that system with our arrangements, and we find that the disadvantage is very striking. That, of course, applies to the shippers about Hobart. A large quantity of fruit comes down from the Huon district in small craft, and that requires just as much handling as here. But Adelaide has the advantage of being the last port of call (applause), and we are nearer to the English market. We are fully a week or eight days nearer than Hobart, and probably a fortnight nearer than the Huon growers, and that would probably compensate for our disadvantages. Besides, the chambers are not opened after leaving our port. That fact may have something to do with the superiority of our fruit this year compared with the fruit of the other colonies. Australia has a very big problem yet as regards the export of fruit,

both as to expense and how the fruit is carried. There is not so much in the nomenclature of apples as at first might be thought, but there is quite sufficient to make it altogether desirable to adopt the recommendation of Mr. Sage. (Applause.) We are not alone in this matter. What occurs to us with regard to the Cleopatra occurs to other colonies with respect to other apples. For example—Scarlet Nonpareil was shipped under three different names by Tasmanian growers.

The GENERAL SECRETARY: Whilst in Hobart I saw two large ships loading. On that occasion they did not have any shoots. The cases of fruit were dumped down on the wharf, lifted in the slings—about a dozen of them—and dropped down the hold much in the same way as from the lighters in South Australia.

Mr. W. SAGE: I move—"That a committee be appointed to draw up a list of apples chiefly exported, together with their true names and their synonyms. Such list to be forwarded to each of the principal growers and exporters, in order that they may select the name for each variety which they think most suitable, and that the name for each variety selected by the majority shall be adopted for export purposes."

Mr. W. C. GRASBY: I will second the proposition.

The CHAIRMAN: Would it not be well to provide that the resolution should be forwarded to the other colonies.

DELEGATES: Hear, hear.

The CHAIRMAN: If South Australia acts alone it would not be sufficient.

The GENERAL SECRETARY: It would be sufficient for South Australia.

The CHAIRMAN: We should remember that the fruit in England is known as Australian.

Mr. SAGE: I am quite agreeable to a provision as suggested by the Chairman being inserted.

Mr. A. HARPER: I would like to know how people will be able to know the names of the fruit. Some call the fruit by one name, and some by another. If we pass this resolution I think that we should need an expert to tell us the names.

The GENERAL SECRETARY: I take it that the committee would first of all give the true name to the apple which is commonly called Cleopatra for instance, and they would give the synonyms by which it is known here and in the other colonies. And it will be for the growers to say whether we shall call the apple by the true name, or by any of the synonyms. A majority of the growers would decide. You cannot send round samples of the apples. You will have to decide on some course before next season in order to export under the proper name, or the name you select.

Mr. GRASBY: The problem of naming and coming to an agreement about the varieties of apples grown in South Australia is a problem too great for mortal man. But there are only a comparatively few well-known varieties that are shipped in quantity, and, in seconding the proposition, I have in view those standard or well-known kinds which, under one name or another, are known to everybody. The other varieties, if shipped at all, would be sent under the names people cared to send them. I think, therefore, we can do something in a small way to settle this problem.

A MEMBER: Does not the expert at the Port Adelaide dépôt open a case as a sample, and would he not be able to put the proper brand on?

Mr. QUINN: That would mean another furthing a case added to the cost. I have frequently gone to the trouble to print the name on the case simply because the name given by the consignor has been some outrageous one, but I got tired of that.

The CHAIRMAN: Perhaps Mr. Napean-Smith would like to say something on the subject.

Mr. G. F. NAPEAN-SMITH: Well, first of all concerning the cases. I do not know for how long the Peacock case has been sent home.

Mr. GRASBY: Three seasons.

Mr. NAPEAN-SMITH: Three years ago I tried a case as nearly as possible similar to the kerosene case, and I also sent a Tasmanian case. To begin with, the Peacock case costs more money. The Tasmanian case can be imported here in the flat at 5d. or 5½d., and it would cost a penny more to knock it together. Then it is an innovation to send this case. When we send a new case there is always some kind of suspicion. You have to pay for innovations, until you get a footing, and I am not prepared to go in for innovations until after others have paid for the experiment. (Laughter.) The Tasmanian is a well-shaped case. I have packed my own cases and I have employed packers. I have sent a few thousands in my time. There is certainly a little more difficulty in getting a large apple in a small case, but, after all, the question we have to consider is the price we get for our fruit at the other end. If you get 16s. 6d. a case for large apples in the Tasmanian case, and only 12s. 6d. for those in another case, I say, stick to the Tasmanian case. (Hear, hear.) I quite agree with Mr. Sage and Mr. Grasby as to what they have said about the nomenclature of apples. We are shipping fruit under all sorts of names, and although they are sold to sample, I admit it would be better all round if they were to be put on the market under one particular name. The varieties sent away from the colony are, after all, so few that I do not think there can be any difficulty in fixing the names.

Mr. A. B. ROBIN (Nuriootpa Branch): I do not claim to be a fruit exporter, although I have sent fruit for the last five years. I quite agree with Mr. Sage's proposition. I do not think there would be any difficulty in identifying the apples, because there are only about five or six apples which will pay to send from this colony — the Cleopatra, Dunn's Seedling, Rome Beauty, Jonathan, and probably the Ribston Pippin. I think that the Bureau ought to do something to try to get a rebate of duty on all cases exported.

The CHAIRMAN: Hear, hear.

Mr. ROBIN: I should think that the fruit would be packed in the Peacock case in half the time that it would take to pack any of the other.

Mr. T. BEST (Mount Bryan): If we could only go in for the cultivation of certain sorts and grow an average size, it would be better than to grow big and small fruit.

The CHAIRMAN: I think we shall all be glad to hear Mr. Pitt on this important question if he would be so kind as to speak.

Mr. PITT (Felixstow): During the past season I have had a little success in exporting. My average has netted about 3s. 3d. I found I could get first grade apples very much better in 10in. x 12in. case. I have at my place about seventy varieties, but for export I should not select more than about half a dozen out of them. I sent twenty varieties to London, and out of them I suppose about eight did not pay expenses. There were about six that paid very well. Mr. Robin did not mention an apple which I found to answer my purpose the best of any. That is the Strawberry Pippin. I did not have a single case out of about 400 cases of Strawberry Pippins that brought me a low price. (Hear, hear.) We are asked in some respects to follow the other colonies. But what have we to learn from Tasmania? We have heard they have given one apple three different names in shipping. The true Scarlet Permain they have called the Scarlet Nonpareil. Nor do I think we have anything to learn from New South Wales or Victoria. (Hear, hear.) Let South Australia stand on her own merits.

Mr. QUINN: Perhaps we can convert them, Mr. Pitt.

Mr. PITT: Let them follow our example if they like.



The motion was put and declared carried unanimously, and the following gentlemen were appointed the committee:—Messrs. S. Hannaford, Gumeracha; W. Merchant, Norton's Summit; W. Sage, Angaston; A. B. Robin, Nuriootpa; E. Pitt, Payneham; G. Lewcock, Clare; and G. Quinn.

### **Adjournment.**

The Congress adjourned at 12:15 p.m. until 7:30 p.m.

FIFTH SESSION, THURSDAY EVENING, SEPTEMBER 9.

The Congress resumed at 7:30.

### **Address by Professor Lowrie on Dairy Cows and Milk Yields.**

There was a very large attendance to listen to an address by Professor Lowrie, M.A., B.Sc., Principal of the Roseworthy Agricultural College, on "Dairy Cows and Milk Yields." A large number of diagrams and tabular statements illustrative of the subject of the lecture were displayed on the walls.

The CHAIRMAN: I have pleasure in introducing Professor Lowrie to the meeting. He has gone to a great deal of trouble, and therefore I am glad to see so large an attendance to listen to his lecture. I believe you will profit very much by what you will hear from him.

Professor LOWRIE, received with applause, said: I should have liked to have been in a way better prepared for this address than I am to-night. I have plenty of material, but I feel that the subject is one that is worthy of very considerable preparation, and that the best should be made of it, because in our South Australian dairying interest, if the full benefit of the industry is to be reaped by the State and the individuals engaged in the industry, I think, as far as things are going now, it is more by attention to the milk yields than in any other direction. (Hear, hear.) We have in this colony the very latest machinery, or I may say developments of machinery: we have the separator, the butter worker, and freezing machines, and we have an export business worked up as efficiently probably as in any other colony; but we have not yet got the very first essential—that is, a first-class dairy cow all round. Some men may demur to a statement like that, but if they look at it in a reasonable, unprejudiced way, they will not be prepared to argue that there is not opportunity in this colony for those engaged in the dairying industry to increase their profits to a very considerable degree by attention simply to the milk yields of their cattle, and by efforts to increase the yields. (Hear, hear.) Now our dairying business, if it is to develop as extensively as some people believe, must look to the outside market that is to absorb the produce, and here we have to compete against the other colonies in which the conditions—in Victoria, at least—are more favourable to the man who owns the land, take it as a whole, than they are in South Australia. You may probably have wondered why Victoria has gone ahead with such vast strides in the dairying industry, while South Australia has seemed to lag behind. But if you visit Victoria and compare the conditions there with ours, it will stare you in the face, even as you travel in the railway trains, that the dairy farmers have a great advantage. Much of the best grazing country in that colony is heavily timbered; the cost of clearing it would be great, so the owners have to graze it until it will pay them to clear it, and they have the money to do so: and what brings a surer revenue than by grazing the land, seeing that the produce is quickly disposed of for cash. Now, much of our country is cleared land; the greater part of our wheat-growing land—quite nineteen-twentieths of it I should say—

can be cultivated with the plough. In Victoria they have to put very considerable labor into the land before they can get much of it into condition for the plough; therefore, with a fairly good rainfall, they find dairying to exactly meet their needs, and they have developed it in a wonderful way. Then we have to compete against Denmark, Sweden, Normandy, and to a greater or less extent against America; and if in the future it be found that this butter export trade to Britain is more profitable than the dead meat trade, we shall, no doubt, have South America also a competitor in this industry. But I think, looking at the figures and taking note of the relative amount of produce introduced into Britain from different countries, that the country which is likely to determine the market in London or Britain is Denmark, because even yet apparently when so many countries are taking a hand in this trade Denmark is doing more than all the other countries put together. Now, I have an example of the kind of conditions that we have to compete with. There is a Danish co-operative factory. The milk is supplied by small farmers, and the milk reaching the factory comes from 900 cows. There are eighteen farmers, and each gives security for 11s. for each cow kept to supply the factory, which means that if he has fifty cows he gives £27 security. With that security they go to the bank and borrow at 5 per cent., which pays off capital and interest in thirty years. Neither the treasurer nor the secretary receives fees. The treasurer is the schoolmaster, and he does the work gratis. If we in South Australia pay directors' fees we are handicapped as against the producers in Denmark. Whether we should not have sufficient philanthropy or public-spiritedness to cause men to devote a little time to the carrying on of a dairy factory without receiving fees is a question for you to discuss; but you must remember that you have to compete with a country in this trade where fees are not paid, and where there are men willing to do such work without charging for their service. (Hear, hear.) In this factory the manager is paid £280 per year; but out of that sum he has to pay for labor, which leaves him about £120. In 1895, when the price was high, they paid slightly under 4d. per per gallon for the milk. The profits, if any, from the factory are shared. The selling price of butter at the factory was 10d. per pound. Now, I have given you an example of some of the conditions prevailing at a factory. We will see what the conditions are on a typical Danish farm. The tenant is a lady; area of farm, 750 acres. Rent and taxes amount to about £1,000 per annum. (Oh!) That is about £1 6s. 8d. per acre. We have a very considerable advantage there. (Hear, hear.) Our best land is worth 9s. or 10s., and a lot of our good dairying country can be got at 5s. per acre; and I would reckon that we can get as much for £1 per year as the Danish tenants pay £5 for, and, with four acres to the cow, we get a lead of from £2 10s. up to £5 per cow on the rent. That is fairly good encouragement to allow for our greater expenses in other directions. Out of that £1,000 a sum of £450 is fixed rent, while the rest varies with the prices of corn and butter. If the prices of corn and butter are high, the rent is higher; if the prices are low, the rent is lower. They are still old-fashioned enough in Denmark to have that manner of fixing rent, and in 1895 the rent of the farm I refer to came to £1,000. Then all repairs have to be done by the tenant, and the stock and implements belong to the tenant. On the farm worked by this lady a married man's wages are £25 per annum, plus cottage and garden, with light beer and skim milk. For working the land, 750 acres, sixteen men and thirty horses are kept regularly employed, and more are engaged at harvest. I suppose here we would keep about four or five to work the same class of land. So if we have to pay more for our labor, we get more out of it. We have got improved implements and other conveniences which they have not, as a rule, in Denmark. On this farm I speak of all the oats and barley grown are used for feeding the stock; the wheat and rye are used in

the house. Rape cake is bought, and 6lbs. per day given to the cattle in winter. The yield of milk from the cows averages 600galls. each per annum, and 24lbs. of milk make 1lb. of butter. A lot of ice is used in the dairy. The skim milk and the butter milk, with caraways, are converted into cheese and sold at 2d. per pound. The lady keeps 200 cattle on the farm, and of these 160 is the average milking number. That is the country we have to compete with. We have one very great lead in regard to the value of the land and the rentals. We have another, I think, in the fact that we have our country fenced. In Denmark the cows are tethered; and on the farm I speak of two men are employed entirely in removing the tethers, a work which has to be done every few hours.

A DELEGATE: It preserves the grass. While the cows are grazing in one place, the grass is growing in another.

Professor LOWRIE: While the cow is feeding in one place without a tether, the grass is growing in another. (Laughter.) I admit, though, that probably you will get more growth by feeding a place clean out, and then leaving it to grow again. The feeding of lucern is an example of that, and, no doubt, a little more would be got from the land in that way than if cattle are continually nibbling at the feed and walking over it. One man is employed in watering the cows, and the three men attend to the cows in the byres in the winter. There again we have an advantage, because house feeding is not needed here. It is necessary for us to feed cows in the winter, but not necessary for us to keep them all day and night inside, and generally speaking, it would be a mistake for us to do it. The cattle will be better out all night, too, in the average districts, than tied up inside. Some cows in cold and exposed parts may be better for being tied up, or put into sheltered yards, but I am convinced that in the average of our dairying country, cattle going out at night, though it be bleak and cold, will do better than if kept inside. On this farm milking begins at 4 a.m. and at 4 in the afternoon. Swedish milkmaids do the milking. These women are imported for that work and nothing else. At one time they used to be asked to do other work, but apparently, they struck against it. Their wages are £6 15s. per annum, plus board. The cowman's wages are £11 5s., plus board.

A DELEGATE: How many cows do the women milk?

Professor LOWRIE: One woman to twenty cows. That, gentlemen, is I think a fair example of the dairying conditions in Denmark. I have quoted from a trustworthy authority, Bath and West of England Society (G. Lloyd Baker), to show you what we have to compete with, and, as I said when I began, if we are to make the most of our advantages in this fight—because all business is practically a fight—it is by attention to the breed of cows, to their feeding, and to other conditions which will work up the average milk yield. I take it, then, it is for me to talk a good many common-places, but on the whole endeavoring to show that there is the opportunity with us for an increase of our dairy yield to an amount very nearly double that of the present time. That looks like big figures, but if you look at the question all round I think that you will be inclined to grant what I say. How is the thing to be done? In the first place, by improving the breed of cattle. Out of the cattle we have in this colony there are the Hereford, Devon, Shorthorn, Jersey, and Ayrshire, and, to a small extent, Holstein, and we have what may be called the country cow. Now the Ayrshire, Jersey, and Holstein are recognised milking breeds, as everybody knows. The Shorthorn, Devon, and our country cow may or may not be good milking cattle, while the Hereford, which we have amongst us in abundance, are, in the first place, beef producing cattle. The question has been fought out in a good many countries as to whether the dairy breeds proper are more payable than breeds which

combine the dairying with beef-producing qualities. For us I think it is a comparatively unimportant question. Our cows, no matter how symmetrical they may be, and whether they may turn the scale at 1,400lbs. or 1,500lbs., live weight, when they are 9 years old, are worth about £5 each if they are worth that. Sometimes they will go a little more, but we may take it as an average that a good beef cow at that age is worth £5. Now consider that you have £5 distributed over six years, which will give you about 18s. per annum, and ask the question whether it would not be better worth your while to have a cow for milking during that period than to keep one for beef purposes. Are we to get the greater value from the milk and butter or to look to the beef for the return? Will it be worth our while to keep these larger cattle to get this extra price when they go to the shambles or to dispense with them and take the butter returns from Jerseys and Ayrshires? I think there can be no doubt that in South Australia it will be far better for us to go for the milking breed when our prices for beef cattle are so low. If it is a debatable point in England—and the breeders there know what they are talking about—whether they should keep the milking breeds or the beef producing cattle, there can be no question as to our position. It will be better for us to go for one or other of the milking breeds, even if the cow fetched nothing for beef. Now that the dairy factories are taking in the milk after it is tested for butter fat something more than the bulk or weight of the milk must receive consideration. Quality as well as quantity has to be considered, and when it is borne in mind that we have a mild climate I am of opinion, in view of all her advantages, that we should vote in favor of the Jersey cow. Our export trade at present is chiefly butter. Whether time will develop a trade in cheese I do not know. Perhaps Mr. David Wilson will be able to tell you. (Hear, hear.) Take things as they are now. It is butter that we sell, and on the face of the earth the butter cow is the Jersey. That, I think, is allowed nearly everywhere, because the color of the butter is better, the quality is higher, the fat globules are larger, and the amount of guernsey obtained from a certain amount of milk better. (Hear, hear.) The Guernsey cow is her recognised competitor, but we have not got her here. If the Jersey is the best butter cow, and if our export trade is largely in butter, that is a good argument in favor of introducing a good milking Jersey strain of cattle. But that cannot be done in a day, nor in a year, nor in half a dozen years.

MR. DAVID WILSON, of Victoria: Not with a Government bull? (Laughter).

PROFESSOR LOWRIE: No; not with pretty well a thousand bulls. It takes years for the stock to grow.

MR. D. WILSON: All Government bulls are likely to have two calves. (Laughter).

A DELEGATE: Both bull calves.

PROFESSOR LOWRIE: Whatever happens it will be some time before we can make any headway, but at the same time, we can be up and doing, though we cannot expect that the average farmers can be going all round for pedigree Jersey cattle, such as those very excellent cattle on the show ground to-day. Here I would say that the colony of South Australia is to be congratulated on having such men as Mr. Angus and Mr. Murray in its midst—who are willing, no doubt for business ends, if we look at it in that narrow-minded way—and who have the energy and enterprise to take the risk of importing these valuable stock at very considerable expense, not only in the purchase, the shipping and incidentals, but the quarantine charges. (Applause.) Now, that expense at the quarantine grounds is one which I think might fairly be brought under the notice of the Government, considering their present attitude of doing a considerable deal to encourage the farming industry. It might be that if the question were brought by this Bureau directly under the notice of the

Government it would receive very favorable consideration. (Hear, hear.) I think that a man who has bought cattle at a big figure—Mr. Angas, for instance, bought the first prize at the Cambridge Show—might very well be told by the Government, “You have done good, let us hope for yourself, but you have undoubtedly done good for the community, because you must sell that new blood amongst our herds and flocks, and through that getting out amongst our producers the community will be benefited. Let the community then pay part of the expenses entailed by law.” The quarantine regulations are framed to save our cattle from the risk of disease, and I say by all means keep them strict and stringent; but as they are for the safety of the stock in the colony, the community is benefiting by the regulations, and I think it is therefore hard that the whole of the expenditure should be charged to the man who has the enterprise to import fresh stock. (Hear, hear.) I hope that before very long the Government will see that it is a fair tax on the community to take over these quarantine expenses. The Government expenses are probably relatively little; the agents expenses are heavy, and I think that the Government might very well pay for the feeding and the attention, without taking any risk. So much for that digression. I was saying it might not be necessary or desirable for farmers generally to go in for pedigree cattle. If they can go in for pedigree dairying cattle they could not do better. But if you give attention to little bits of coloring, certain marks, a certain class of nicely turned horn, and such things that the show-yard judge lays so much stress upon, and take them as a guarantee that you are getting a particular blood for milkers, I would say that a milking pedigree from a dairyman’s point of view is better. In Scotland the women go up for dairying certificates, and a dairymaid who was asked at an examination by what means she would judge a cow replied, “by milking it.” The judge tried to push her a bit, and asked whether there were not any other means that she would take, she still replied that she would just milk it. The girl was fairly near the mark. We could tell a good cow if we had half a dozen and were told to pick out the best three. We might pick out two, but perhaps not so many. It is like dealing with racehorses. The horses gallop in all shapes, and the cows milk in all shapes. We have to endeavor, I think, in whatever breed of cattle we favor, to look very carefully to the history of the dam of the bull we are using.

MR. D. WILSON: And you cannot get it.

PROFESSOR LOWRIE: Everybody admits that it is necessary. We have developed a good deal of energy in other directions. Take, for instance, the energy put into agricultural societies—a movement that has fairly run wild—I would say there are about ten times too many of them. If that energy had been put into one thing, among others that I could name: if it were put into the direction of having regular tests made at the different dairies of cattle entered for a milking pedigree, and these tests were brought to the central agricultural society—because this is not a matter of centralisation at all—and, if the branch societies in the country took an active interest in creating a milking pedigree, a great service would be rendered. As it is, these petty little district societies play the deuce with any movement of the sort, and are keeping the good men in the country out of any practical work, by making them be chairmen of the district societies. Whereas the agriculture of the country at large should dictate the policy of the central society. That policy is now directed by the district of Adelaide, with the help of a few large holders. (Hear, hear.) If part of the energy expended in the country on useless little societies were directed into working committees for regular testing of milking qualities, you might very soon establish a pedigree. You might take the owner’s word for the quality of the cattle: you take his word for other things. Cooking pedigree is a matter very little known at present. I have never had much to do

with pedigree stock, but I should say it is a practice relatively little known; but you could trust to the word of the owner, confirmed by an occasional test, and then you could have certain cows registered. I would register all above 500galls. per annum for a time. That would be a very decent minimum. (Hear, hear.) We should not load the stud book with names by getting down to 400galls., because there are cows all over the colony that yield as much as that. (Hear, hear.) If there were a pedigree register kept in this way by the central society, and if the cattle are pure bred, look at the value of such a register to the seller, and to the purchaser, if he is keeping dairy stock. The boards of management of the dairy factories might do considerable work in this direction; and I believe it would be to their advantage, because it would lead to their getting larger supplies of milk. It would be time fairly and legitimately occupied, to help in the registering and classification of these pedigree cows, so that people who want to buy young stock to raise the average yield of their herds may know where to go. At present we buy blindly. We trust to the appearance of the beast, which, though it goes a long way, does not go all the way. (Hear, hear.) These tests might be made, not only as regards quantity, but quality. From these registered cattle young bulls which are purebred beasts should be drawn. I would not advise breeding from a crossbred bull, even though his dam gave 800 or 900galls. a year. (Hear, hear, and dissent.) I know certain people hold different opinions. I would not breed from a crossbred bull, however good his dam, if I could get a purebred bull with a good dam.

MR. D. WILSON: Men are not prepared to pay a very high price for a purebred bull as against a crossbred.

A DELEGATE: Where is the benefit in going for a purebred bull?

PROFESSOR LOWRIE: Simply because we cannot turn the work of Providence upside down. There are certain laws in nature that are inviolable. There are biological laws in breeding that are just as absolute as the most absolute physical law, and one of them is hereditary influence.

MR. D. WILSON: What about the rest that animals take for generations?

PROFESSOR LOWRIE: You are speaking of stock cast back. Everyone grants that, and it is but the exception that proves the rule of heredity. Whoever heard of a cocktail, a halfbred horse, winning the Derby?

A DELEGATE: A non-pedigree horse, Bend Or, won the Derby.

PROFESSOR LOWRIE: You are making a mistake; Bend Or was a pedigree horse; he won the Derby in 1880, I think. He was sire of Ormond.

MR. MOLINEUX: I think gentlemen should allow the Professor to proceed without interruption. He is here giving a lecture, and he should be allowed to go on in his own way. (Hear, hear.)

MR. D. WILSON: I only wanted to give the Professor a rest—to give him a “blow.” (Laughter.)

PROFESSOR LOWRIE: It does not matter to me at all; in fact, I rather like to meet objections at once. I will take Mr. Wilson's point that there is something to be said for crossbred stock, and that there is not sufficient chance of getting the best milking breeds from purebred cattle in our colony. We have to argue this question from analogy. Does breeding from crossbred sheep on both sides turn out satisfactory? In France they tried for many generations to produce a sheep that would give the mutton of the English sheep and the wool of the Merino. The Government spent many thousands of pounds in experiments. Have they got such an animal? No. They are breeding the Merino sheep there now, and pure breeds for mutton. The halfbred sheep of the south of Scotland is another example.

A DELEGATE: Do you approve of breeding in?

PROFESSOR LOWRIE: That is beside the question. We cannot expect a farmer to have all pedigree stock, but I think his bull should be pedigree, and

if possible pedigreed additionally and more worthily from a milking dam. I go dead against all breeding from measly, cross, ugly-looking, bastard brutes such as you can see any day in the country. Some of them are going about in the neighborhood of Roseworthy, and they are the most miserable brutes possible. (Laughter.) Why a farmer should bother to keep such things I cannot for the life of me understand. What would we think of a farmer who would go to a miller and buy seed wheat without any idea of its kind or quality? Well, some farmers carry that sort of habit into the breeding of their stock, and they keep bulls that are not only a nuisance to themselves, but a nuisance to the whole neighborhood. The sooner we work up a feeling against that sort of thing the better. (Hear, hear.) You see that I have, to some extent, leaned in favor of the Jersey breed of cattle. A while ago I used to keep the Ayrshire well forward, but, speaking without prejudice, I think that, as we are a butter-producing community, the Jersey will be found to suit us better. I would put a purebred Jersey bull on the best milking country cows that I could get hold of. I would look very particularly into the question which were the best milkers, and I would go back again and again to the Jerseys until the herd was three-fourths or seven-eighths bred Jersey. Then I think I would have the best possible dairy herd. (Hear, hear, and dissent.) There is a breed of cattle in Britain known as the Red Poll cattle. Some of them are in New South Wales. They are very heavy, deep milkers, and good beef-producing cattle at the same time.

MR. D. WILSON: What about Holsteins?

PROFESSOR LOWRIE: They come in the same category. They will give a deeper yield of milk, but they are not such good butchers' beasts as the Red Polls.

A DELEGATE: They eat a lot.

PROFESSOR LOWRIE: Yes. They are cattle that need favorable feeding conditions. They are big heavy cattle, and unless you look after them particularly well in the matter of feeding you will find they will go down. If you could have stock like those in the show yard, all would be well; but if we started milking Holstein cattle, do you think we could keep up to that standard?

MR. SHANNON, M.P.: Can you keep up the standard of the Jersey?

PROFESSOR LOWRIE: Yes. The champion Jersey in the show yards to-day was bred in Australia. But I say we are not prepared for the Holsteins as we are for the Jerseys. Are you going to spend half the colony's revenue in importing cattle? We have had the other breeds I have mentioned in the colony. The forefathers of this audience imported them. We have something to go on. But if we are to go for Holsteins then we need either to import very largely, or else wait until the Holstein cattle we have in the colony overtake the conditions; and by the time that happens the butter trade may be out of existence. (Laughter, and hear, hear.) It is a delicate thing for me to argue in favor of one breed of cattle against another. I know there are good milking cattle in all breeds—even in the Herefords—and many of the greatest results of dairy tests are from Shorthorn cattle or Shorthorn crossbreeds. I am not losing sight of these facts. If we got on to a good strain of Shorthorn cattle, we might get a good milking average. But I am arguing for what I consider the cheapest and best means of providing ourselves with good butter cows. I believe this is one of the means—being careful to keep pedigree bulls, that have in addition a milking pedigree to their dams, and by breeding from the best and richest milkers amongst our country cows. (Hear, hear.) Now, there is another way of increasing the yields of milk, and that is by feeding the beasts properly. (Hear, hear.) It is said "what goes into the mouth makes the beast." It determines the milk yield of a cow to a considerable extent. Whercin can feeding be improved? It is curious to

read the discussions of the Branch Bureaus on this subject, to notice how every Bureau agreed that much could be done by the introduction of summer fodders, ensilage, and fodder crops. But how many of the farmers worked this out? It is only here and there that these ideas have been put into practice. The prevailing custom is to bring a cow in when the feed is beginning to come, and to milk her so long as there is feed, and then let the poor beast starve the very soul out of herself afterwards. That custom undoubtedly takes away a big percentage of profit from our dairying industry. Every man knows that if a beast goes down in condition she requires considerable time to recover that condition, and that she cannot be expected, while the process of recovery is going on, to do her best as a milker. (Hear, hear.) Last year there was some excuse, because the season was so bad and feed was so dear; but even with an average season this sort of thing goes on. And when the feed does come do you think that a cow which has been allowed to run down is in a healthy condition to make the most of it?

Mr. D. WILSON: Pedigree does not count for much then.

Professor LOWRIE: The pedigree beast may succumb, while a useless half-bred beast would live. (Laughter.) But if we have anything good we take particular care of it. (Hear, hear.) If the farmers would take as much interest in criticising bulls and dairy stock as the farmers in the North do criticising their neighbors' draught horses, much good would result. In the north of the colony, more especially from Jamestown round to Mannanarie up to Blackrock, bad conditions though they have, the men own the best teams in South Australia. Look how anxiously the merits of the draught horses are watched, and how great an interest is taken in the prize list. Why cannot our farmers in the southern districts take as much interest in their dairy cattle? (Hear, hear.) If they did they would think many times before they allowed the cattle to get poor, with the feed low and the weather cold. They would keep them in a nice healthy, thrifty condition, with a nice warm coat on during the winter, so that when the feed becomes good they would get the full fruition from it and reap the profits (Hear, hear.) I think that by growing part of the fallows with summer fodders—if, for example, maize be tried, as it is by many in the Woodside district—the farmers would get feed for January and part of February. They could put on other parts a bit of sorghum, that comes in February. They can make ensilage in three weeks' time from now, that will feed splendidly in May, and many can grow a crop of mangolds that will help them through the winter with silage or bran, and the advantage will come back twofold. We have undoubtedly a possibility of a succession of succulent fodders the year round, and if we take advantage of that possibility by growing maize, sorghum, millet, a few mangolds, lucerne, making ensilage, and helping out the feed with a little bran or copra cake, you may keep your dairy cattle in good condition constantly, and you will get manure for your land. You would raise your milk yields from the present quantity of 350galls. or 370galls. to 500galls.

Mr. D. WILSON: Take 100 off.

Professor LOWRIE: I can only take the average. I am judging from the reports of the Bureaus; here are some of them. At Pine Forest 200galls. per cow was about the average, and is profitable. If that is profitable what a fortune there must be in dairying. (Laughter.) If a man has any skill at all, and pays attention to it, he should get 500galls. per cow. Bowhill Bureau thinks 400galls. to 600galls. should be aimed at if the industry is to be made profitable, but they do not say what they are getting. Gladstone considers 400galls. necessary to make a profit, and mentions that lucern, mangolds, maize, and sorghum are growing, but there are only a few people doing it. Johnsbury says that 300galls. would be profitable. Mount Gambier goes for 600galls., but says that 350galls. would pay. I think that their average is higher than



350galls. Paskeville says about 300galls. would pay, and I suppose that is their average. Golden Grove mentions about 350galls. The average in South Australia is not, I think, above that amount. In Victoria the average is about 350galls., in New South Wales 270galls., in Great Britain 450galls., and there they know perfectly well that, if they are to hold their own at dairying, they will have to better the 450galls. In one of the States of Holland the average is 900galls. per annum—

MR. D. WILSON: So it is, I should think, at your Sewage Farm.

PROFESSOR LOWRIE: No; the Co-operative Society's dairy cattle average 477galls per annum. In Denmark the average is about 450galls., so that we have a very considerable leeway to make up, which I say, with all due consideration to our fickle climate, is more than possible in our dairying districts. I trust that in a meeting like this the discussion that will follow will have the effect of causing the farmers in South Australia who are looking to dairying as a means of livelihood, to wake up and see to it that they are doing their utmost to provide that their stock shall return, instead of 350galls. or so, 500galls. per year. (Applause.)

THE CHAIRMAN: I have taken a very great interest in dairying during the last few years, and have studied to some extent what has been done in Denmark. No longer ago than 1882 Denmark was quite as badly off in respect to dairying as we are at the present moment. The quantity of milk that their cows were giving was certainly no better than is given in the majority of cases in South Australia. What has Denmark done to make the improvements we see? She, as well as the United States, has not stinted to put forth her powers to introduce the very best pedigree of blood that was to be had. No matter whether the bull cost one thousand guineas, it must be had; and that was the policy too in the United States. It has been asserted, and it is quite true, that originally the Holstein was not in favor as a milker, but what has been done with that breed in the United States? By sending around in Holland to see where the best bulls could be got, and by purchasing those bulls, whatever the price was, the result in the United States has been quite astonishing: and at the present moment a very fine breed of Jerseys and the Holsteins run neck and neck together. The quantity of butter fat from the Holstein cattle has been largely increased. In one instance we find a Jersey cow a few pounds of butter ahead, and in another case the Holstein cow is ahead. I could give you a number of examples of this rivalry, if so desired, but there are many gentlemen here to-night who no doubt will give their opinions on this important matter, so that I had better say no more on the subject at present. I might mention that in Denmark, in 1868, the average yield of butter per cow was 112lbs., in 1872 it was 146lbs., and the quantity has been increasing ever since. The weight of the milk has also nearly doubled since 1882. So it is no wonder that Denmark has taken the place with regard to dairying that it now occupies. There is one other matter of interest I would mention. It is very well for the Government to introduce Jersey bulls, but you cannot expect the Government to send four out of the eight bulls to one place. I see there is an application that four of them should be sent to Hawker. In Denmark the people have their bull associations, and we should do the same. I know that some of our Bureaus have purchased bulls, and to some extent have followed the example of the Denmark associations. I would just mention how it is done. There are a number of cows selected for the bull—I hope that the number in this colony is not too large. In Denmark the committee selects 100 cows for the bull. Then, of course, you would expect to have a herd book for every bull association, and that course has been followed in several countries. I hope that what has been done in some few instances by our Bureaus will be very much extended. Perhaps Professor Lowrie would give sufficient information generally as to what ought to be done.

Mr. W. CORNISH (Gumeracha): I move a vote of thanks to the Professor for the very able address he has given us. I have never been to the College at Roseworthy. I had intended to go next week, but after the Professor's description of the bulls that are in the neighborhood, I am afraid to go. (Laughter.)

Professor LOWRIE: They are not limited to that district.

Mr. CORNISH: I am very pleased to know that the quality of our milk bears favorable comparison with the milk in the other parts of the world, and that we are able to make as much butter from one gallon of milk as is done in other places. There is one thing I am disappointed over, the Professor does not favor the housing of the cows here in the winter. I would ask him whether he does not think a cow feels the cold as much in this climate as others do in colder climates, because in colder climates they are acclimatised. I am strongly of opinion that it is a good thing to house the cows. I have tried many ways of treating cows, and have come to the conclusion that if I spend £100 on a building to keep them warm at nights, the expenditure will return more than 5 per cent. interest. The cows will keep their heat and will not demand so much from their food to keep in condition as if they were exposed at night. Undoubtedly the system of allowing cows to go dry during the winter is unprofitable. I have started to erect a building to shelter my cows, and I mean to go on with it, because I believe it will pay.

Professor LOWRIE: On the matter of housing the cows, I said that in the colder districts of South Australia I thought cattle should be housed, but that in the average districts I believed they would do as well outside. In the district where I am, the milking goes off if I keep the cows in during July and August. They do better outside, except on the blenkest and stormiest nights. If we had the ideal cattle yard the case would be different. My idea would be a sort of small loose-box pens, where the cow would be free, but where the cow is tied up by the neck the irritation counteracts the undoubtedly physiological fact that the colder weather will take the benefit of some of the feed out of it for the needs of the cow. In the colder districts, like that of Gumeracha, I would say "house the cows, by all means."

Mr. W. G. MILLS (Kamantoo): I second the vote of thanks. I know a cow that has given 19lbs. of butter per week, and she is the biggest scrubber that ever you would find. If she has any breed about her at all, it is the Devon. Of course she is well fed. Our failure to get a bigger supply of milk is due to the starving of the beasts for several months in the year. I know a man who gets his living from 16 acres of land by keeping five or six cows on it, and he keeps them rolling fat all the time, doing as well as others who would want five or six times as much land for the same number of cows. I doubt if fences are an advantage over tethering. When they are tethered and handled, cows become more docile and quiet, and it is then they will give their best yield. The cow that gave 19lbs. of butter, although a scrubber, was well handled, and so was very quiet. I am well acquainted with the management of the Blakiston factory, and the scrubbers, even for the butter test, do very well; some of them as well as half-bred Jerseys.

Mr. SHANNON, M.P. (Maitland): The Professor advocates the Jersey bull as an improvement, and says that the Holsteins would be very well if we had got them here, and they would keep up their condition. His argument does not do away with the fact that Holsteins grown in South Australia may be superior to those imported. If the Holstein is superior to the Jersey now, why advocate the Jersey?

Mr. D. WILSON: Because she gives more butter fat, and we are paid by that now.

Mr. SHANNON: Are we going to advocate a second-rate cattle when we know

that a better class can be got? I will challenge the farmers here to say whether, after using a Jersey bull, they have seen any improvement in the second generation.

A DELEGATE: I would say yes, for one.

Another DELEGATE: I will say yes, too. (Hear, hear.)

Mr. SHANNON: I do not detract from the Jersey cow being a rich butter cattle, but I say that if you are going to put a Jersey bull to common farm cattle, we shall so minimise the size of the cattle that they will be a lot of weeds. What is the fault of our cattle now? The complaint is that they are getting weedy and small.

A DELEGATE: You are talking about beef.

Mr. SHANNON: The yield of milk depends on the size of the cow to a great extent. Will a goat give as much milk as a cow? (Laughter.) To yield a large quantity of liquid you must have a reservoir big enough.

A DELEGATE: You are wrong.

Mr. SHANNON: What produces the milk? The food that goes into the animal's mouth. If it is a big cow, she can consume a larger quantity than a small cow does, therefore can produce more milk. The cow that can take in most feed is the cow we want. (Dissent.) We want to improve our breeds, but to do that we must get more size in them. That will never be achieved by putting on the Jersey. I am sorry that the Professor is so much gone on the Jersey. I maintain, from what I can gather, that farmers can get a better cross from the Ayrshire, and that the stock will do better on hardier fodders, while the milk will be much richer for cheese. The only point in the Jerseys to beat the Ayrshires is their richness.

A DELEGATE: That's just the point. (Hear, hear.)

Mr. SHANNON: But if you get more in quantity, you may more than compensate for loss in quality. Lately I saw advertised twenty half-bred cows, the offspring of a purebred Jersey bull of a very good milking strain, and I would not have paid the fare of one of them, they were such a miserable lot. We want a larger breed of cattle, and I would like the Professor to say definitely, from the information he has before him, if he does not consider that the Holstein would be a better class of cattle to cross on the country cow.

The CHAIRMAN: I have a statement here that the average yield of forty cows at Meningie was 387galls. The prize milker at the show to-day is a half Jersey. She yielded 27lbs. of milk and the test of the milk for butter was 5 per cent.

Mr. SHANNON: What is her other half?

The CHAIRMAN: I do not know.

Mr. SHANNON: It was that that she got her milking qualities from.

The CHAIRMAN: In the United States a cow of the name of Lady Betty has given as much as 34lbs. of butter in seven days. I am merely telling you this, so that you may see what we ought to do here. (Hear, hear.)

Professor LOWRIE: I agree with Mr. Mills, that a very great deal of the profit to be derived from a cow depends on the quiet handling, and, therefore, I advocate milkmaids instead of milkmen. Train the cows to be milked in the paddocks, and let the pretty dairymaids go to them, and the cows will do better all round. Mr. Shannon took me to task very severely, in the style of "I am Sir Oracle; when I ope my mouth let no dog bark." Although his tone of dogmatic assertiveness may do for a higher "Assembly," it is not likely to rule in an assembly such as this. (Hear, hear.) He found fault because I advocated the Jersey as against the Ayrshire, and because I did not pay attention to the size and weight of the beasts. Will he say how much heavier the Ayrshire crossbred is than the Jersey?

Mr. SHANNON: Half as heavy again. (Laughter.)

Professor LOWRIE: It is six to one and half a dozen the other. Take a crossbred Jersey into the market fat, and see whether a butcher would not pay as much for it as for a crossbred Ayrshire (Hear, hear.) The Holsteins are much heavier cattle, and when they are before our eyes as they were to-day, they make a very pleasing picture—fine, large-framed, beautiful cattle from every point of view.

A DELEGATE: What is the yield?

Professor LOWRIE: I do not know: but I know they are the heaviest milking cattle in the world. I also know they have the poorest percentage of butter fat in the world. If you take their large quantity of milk and low percentage of fat, and take the Jerseys, with their less quantity of milk and double the fat—

The CHAIRMAN: I dispute that.

Professor LOWRIE: Have the Holsteins come within  $1\frac{1}{2}$  per cent. of the butter fat of the Jerseys? If so, I know nothing about it.

A DELEGATE: The *Live Stock Journal* bears you out.

Professor LOWRIE: To Mr. Shannon I would say, that if "weeds" are thriving then the Jersey crossbred is no worse a weed than the Ayrshire crossbred. Take the average weight, and what is the difference? Only 80lbs or 100lbs. I admit of the Holstein cattle, that it would be well if we could get that class of cattle here. But how can we, in South Australia, breed the same class of beasts as we have seen to-day? We cannot do it, for the simple reason that we have not the same class of meadow as they have fed on. There is not in South Australia a meadow equal to the average Dutch meadow. (Hear, hear.) I am not going to decry these cattle; I praise the man who introduced them. They are a lovely class of cattle undoubtedly; but, I say, let us use the material we have at hand.

Mr. SHANNON: You gave us the impression that the Jersey would keep up and that the Holstein would not.

Professor LOWRIE: It is true that the Holsteins are specially suited to the Dutch climate, and that they do not do as well anywhere else. Italy imported Holsteins direct from Holland, where they yielded 800galls per annum, and they yield now in Italy from 500galls. to 600galls.

Mr. SHANNON: What do they get from them in America?

Professor LOWRIE: Jerseys won the Chicago tests—the greatest tests yet made there. But Americans have successively boomed nearly every breed.

Mr. D. KIRK (Riverton): I have been breeding from Jersey bulls of late years, and I find the butter far richer than before. I have heard it said that Jersey cows were inclined to be wild, but I have not found it so. If a cow is used well, she will yield well and be docile.

Mr. J. BROWN: I have tried halfbred Jerseys, and I find the butter is better than that from Shorthorns. I prefer the Shorthorn to the halfbred Jersey, but in picking a Shorthorn you must not choose the wrong color. You must have a Shorthorn red, yellow, or white, and if white she must have a yellow skin.

Mr. D. WILSON, of Victoria, on being called upon said: I came here from Victoria a couple of days ago to assist in judging at the show. It is not the first time I have been in Adelaide. I had the honor, at the request of the South Australian Government, six or eight years ago, to try to break you in to the factory system of dairying, and I flatter myself that I succeeded to a great extent—(hear, hear)—and but for the serious drought I believe you would have had thousands of pounds coming to you from England for butter. As I have been invited to speak, I have no objection to make a remark or two. I profess to be a practical dairymen, and I have been very much entertained indeed to hear the intelligent conversation that has followed the lecture of Professor Lowrie on the breeds of cattle and the treatment of cows. You may talk of

broods as you like, until you go to your graves, but unless you cultivate and make greater efforts to feed the cattle, you will get no benefit. I confess to have been a dairyman for thirty-five years, but until I grew feed artificially I never made money at the business. I told you this about eight years ago. Until I got the idea here of having ensilage pits, I never made money at dairying, and I made it fast afterwards. Mr. J. L. Thompson, who was amongst you for a number of years, introduced the system at Dookie. Droughts teach us valuable lessons, if we are ready to profit by them. I have been through many droughts since 1853; but though Mr. Molineux and other enlightened men have been advocating ensilage for many years, you had as many deaths during the last drought as you had in any previous one. Are you going to continue at this? Are the deaths you have suffered and the cheques you have lost going to do you no good? Surely you have learned by this time that when the good years come round you should get a stock of ensilage or hay, so that you will not be found shiftless again. I am not advising you to do a thing I have not done myself. You may talk about introducing fresh grasses. You have grasses and feed of your own if you would only use them. I was addressing a few farmers in the north-east of Victoria not long ago, and a big strong countryman recounted all the risks of failure in sowing maize on poor land with the hope of reaping a heavy crop of green fodder. I told him that I would go on sowing year after year, if necessary, until the crop came. In the Wimmera country I have grown splendid healthy green feed, with next to no rain at all, just by pure cultivation. (Applause.) It is of no use telling me that a man cannot grow green stuff. I do not believe it. If you work the land as Mr. Thomas Hardy does for his vines you will get maize and sorghum to grow. Then the men who have frentages to rivers and creeks, and those who can raise water by windmills can work wonders. One good watering around your drills would do. I believe in sowing these green crops in drills, and I am game to bet a £5 note that I will beat anybody with drills as against sowing broadcast. (Laughter.) There are tens of thousands of cases where men, even in the driest season, could grow fodders for cows, with the help of a windmill. Maize will grow to 6ft. or 7ft high in four months, and when that is so why does a man say he cannot help himself when the cows die? It is a shame to say so. I feel warm on this subject, because I am talking of what I have done and experienced myself. (Hear, hear.) Now that, as I believe, a cycle of good moist years are coming, do prepare for the bad years that will follow. Make an ensilage pit and chaff your stuff into it. If next year turns out as good as this you will not want it. Keep it by until you want it: it is as good as money in the bank. I hope you will act upon this advice. I doubt whether a man who has a herd of cows, and half of them die on his hands after this year, ought not to be prosecuted. (Laughter.) I have no desire to "dress you down," but I am talking for your benefit as a practical man. (Hear, hear.) I have been here for two days, and one of the greatest treats I have had this year was to listen to the intelligent conversation yesterday at one of your meetings. I was entertained by the excellent address of the Commissioner of Crown Lands, by the chairman's address, and especially by the discussion. One of the greatest benefits of this Bureau Congress is that you bring together from all parts of the colony men with differing opinions and experience, who compare notes, and are thus enabled to correct their views. Another benefit I got from attending your show was to observe that, although your exhibition of dairy produce—bacon, eggs, and so on—were not numerous, they were good, and I hope my colleague and myself who were judging gave satisfaction. (Hear, hear.) Yesterday I visited your Sewage Farm. I think it is one of the finest things you can show a stranger. You know we are trying to drain poor dirty Melbourne at last. We propose to bring the sewage down to a plot of

land similar to yours, and I have been asked to report on the most feasible way of utilising the pasturage on the land. The Sewage Farm shows what water can do. There we saw cattle rolling in fat, and yielding plenty of milk, grazing at the rate of three-quarters of an acre to one cow. That shows what the ingenuity of man, with the assistance of nature, can accomplish in the matter of feeding cattle. If you feed a cow well you will get a good quantity of milk from her, whatever the breed may be. But I would say you must have a good foundation, so get a good strain of milking cattle. I have tried all breeds, and would say, with Professor Lowrie, you cannot beat a good common colonial cow and a Jersey bull. I have paid £30 or £40 for a purebred heifer, and £3 10s. for an ordinary-looking cow, and got as much milk from the one as the other. (Laughter.) Do not expect a good return unless you feed the cow well. I have listened to the lecture with a great deal of interest, and I agree with most of the Professor's statements. It has given me much pleasure to visit Adelaide at the present time. (Applause.)

The motion for the vote of thanks to the Professor was carried by acclamation.

Professor LOWRIE: I thank you for the vote, and also Mr. Wilson for his remarks. I believe we cannot discuss matters of this character too frequently, and I am always sorry they have to be discussed at show time, because I think it would be better for us then to learn the lessons provided by the show. For my own part I would prefer just now to be talking sheep. If it were possible, we should have these discussions at another time.

The Hon. A. W. SANDFORD, M.L.C.: I move a vote of thanks to the worthy chairman. He is always at work, either writing original matter, or translating very valuable articles from European papers and magazines for publication in the *Journal* of the Agricultural Bureau. We are all under a heavy debt of gratitude to him.

Carried by acclamation.

The CHAIRMAN: Thank you, gentlemen; but I assure you that I am only trying to do my duty to the colony.

The Congress adjourned at 9.30 p. m. until 10 a. m. next day.

#### SIXTH SESSION, FRIDAY, SEPTEMBER 10.

The Congress resumed at 10 a. m.

### Seed Potatoes.

The CHAIRMAN: I should like to hear from gentlemen present if they could give us the results of their experience in saving potatoes for seed.

Mr. J. W. DALL: I have had considerable experience in the neighborhood of Clarendon. To save our seed we found the best plan was to grow on two kinds of ground. For the earlier planting save the earlier grown seed, and for the later planting save the later sown. We usually put the potatoes in in September for the last planting, and the September planted potatoes usually come in for the following season.

The CHAIRMAN: When, in March?

Mr. DALL: No. We plant generally from the 8th of August to the 10th of September. Unless you use some of the earlier potatoes for March they do not answer. We usually find it an advantage to get 5cwt. of Circular Heads. The produce from them would certainly plant four or five acres in the following year.

The CHAIRMAN: Do you keep the seed from Christmas to August?

Mr. PEARSON: We had a sort of underground dairy, where we stowed them

about 1ft. deep, leaving them until about January, and then we turned them over. Shooting once or twice does not hurt the potato very materially. If you change a few and plant them late, you will succeed in keeping your own seed. When a potato is growing you can tell far better what are bastards and what are pure.

The CHAIRMAN: I am very much obliged to you.

A DELEGATE: There is really no trouble in keeping Circular Heads; but it is better not to keep the Beauty of Hebron. I think it would be better to put the seed potatoes in a loft, where there is more air, than where the gentleman who just spoke recommends. I have known a man who always used to plant in September, October, and November. He generally dug up to April, and he would keep his seed from year to year. I do not believe in keeping seed. I believe in a change of seed every year. You can really get two crops of Beauty of Hebron from the same seed every year. It is far better to sell out and buy fresh seed.

The CHAIRMAN: To keep seed potatoes over from one season to another is a matter of great importance. Mr. Molineux was good enough to bring over twenty kinds of potatoes from the Brisbane conference.

Mr. MOLINEUX: They came from New Zealand.

The CHAIRMAN: I have myself introduced several new kinds from Germany, and am expecting some more. What little produce I got for two or three years past I have sent to Mount Gambier to be planted there again, and so that I may have them next season.

Mr. J. LAWRIE (Port Pirie): Three years ago I saw an advertisement in the paper offering new potatoes. I think the firm who had the potatoes for sale were Messrs. Yates, of Sydney. They were new potatoes, at so much per dozen sets, about the size of a nut—just the eyes—and were wrapped in what looked like brickdust. I do not know whether it was a secret of Messrs. Yates to keep them.

Mr. MOLINEUX: Red lead, I expect.

Mr. LAWRIE: It was out of season when I got them. There was very little rain after I planted them, but they all came up. I got 4doz. sorts, and the seed was as good as if it had been obtained from Adelaide seedsmen. I secured practically nothing of a crop because there was no rain. I wish I had tried them again this year. They were about the size of a round horsebean. I obtained nearly a bucketful of small potatoes about the size of pigeon eggs. I saved them, and I have them planted this year too. I am confident that these eyes would keep for a twelvemonth, and I believe that they would keep just as well in a loft.

The CHAIRMAN: I think it is important enough to put the question to the Branch Bureaus in the potato-growing districts, so that we may get the best opinions. We might ask the Mount Gambier and other people who go in for saving seed. It is very important that we should have new kinds of potatoes introduced so as to prevent disease, which occurs more or less.

Mr. DALL: I should like to ask if it is possible to obtain the American Rose potato in the colony. It is a very early potato, and somewhat difficult to procure.

The CHAIRMAN: Thornber's Early Rose is the one I believe you mean. We have it at Mount Gambier. I introduced it and sent it to Mr. Rudowidt, of Mount Gambier. It does remarkably well. It is a fine potato, and in proper soil grows very large. I think you can get it from Mr. Rudowidt.

Mr. E. J. HARRIS: We have it at Millicent.

Mr. DALL: The potato I mean is a light-skinned, roundish potato, with deep eyes.

Mr. HARRIS: That is the one.

**Mr. MOLINEUX:** As to the brickdust Mr. Lawrie spoke of, it is a common practice for seedsmen to put red lead on potatoes to prevent mice getting at them.

**Mr. LAWRIE:** This is a preservative, and the potatoes could come from any part of the world in it, I should think.

### Breeding Lambs for the Adelaide Market.

**Mr. JOHN DAVEY** (Yorke town Branch) read the following paper:—

The most profitable and quickest returns from sheep-breeding are probably made from early lambs for sale to the butchers. They must of course be marketed before there is a glut. It has been noted that the prices vary considerably, according to the time of year, the highest values being realised from February until May, inclusive, when last year's lambs are too old and the lambing season has only just commenced; hence good marketable lambs are very scarce. The difference in value may range from 6s. to 7s. per head in November to 10s. or 11s. per head in May. Where farmers in the Lower North and cooler districts have a good supply of water I think they could very profitably raise fat lambs for supply of the market during that time. They should choose four-tooth to six-tooth large-framed Merino ewes and Lincoln rams, or perhaps Shropshire sheep might be best, as these lambs develop very rapidly. They should put the rams with the ewes in June. With careful handling when shearing they would not be injured, and would lamb in November. Great care must be taken not to overstock the paddocks, for the ewes must be kept in good condition all the year through. Poor ewes will give birth to poor weak lambs, and they will have but a poor supply of milk; consequently they could never be fit for market as fat lambs. I believe that the percentage of lambs would be as good, or better, in the spring than in the fall of the year. I have seen really good lambs that have been dropped in November whilst the mother has been running with the flock. It may be objected that, although a higher price may be got for the lambs, there is the loss of the lambs' wool at the shearing to be borne. That would be 2½lbs. to 3lbs. of wool at 4d. per pound, say, 1s., which is a fair allowance. Most of the lambs that are shorn are not fat enough for the butcher, and would not realise more than 2s. 6d. to 3s. per head; or, with the wool, 4s. each. Even if fat and shorn the price would not reach the quotation for lambs between the months of February and May. A farmer owning 200 ewes should get 80 or 90 per cent. of spring lambs, which, at fourteen to sixteen weeks old, should sell at 10s. to 11s. each, or total about £80 to £90. I know of nothing that can be produced on the farm that would give such a return in so short a time.

**The CHAIRMAN:** I have just been informed that we have present with us this morning a gentleman who has had very extensive experience in breeding lambs for the London market, and that he is willing to give us some of the results of his experience.

**Mr. C. W. A. SCRIVEN** (of Bordertown): I have very much pleasure in responding to the invitation, and to give my experience as an English breeder of sheep. For some fifteen years I was living within fifty miles of London, and endeavored to supply the London market with fat lambs, and I found that I could not do better than use a Dorset Horn ram with a Shropshire ewe. Mr. Davey says use a Lincoln ram, but I found that it was very difficult to get a Lincoln ram to do any work when you want him. My practice was to put the oldest ewes in their last or third time of lambing with the Dorset Horn ram, and I generally got 150 per cent. of lambs. With a little artificial feeding I could get lambs thirteen weeks old fit for the London market and obtain from £2 to £2 2s. each. When I could feed them off I found there was nothing more profitable than this cross. I believe the breeding of lambs would pay the best of any industry. The difficulty in this climate is to get the lambs just when they are wanted. You want to know the time to get lambs to the best advantage when they are wanted, and that appears to me to be about the same time as in England, about Christmas. In forcing our lambs in England we could get thirteen weeks old lambs weighing 40lbs. apiece. The first thing here in South Australia is to use a breed of sheep, or cross two breeds, which will give early maturity. As neither Shropshire nor Dorset ewes are plentiful enough for this purpose, I advise a comeback ewe (Leicester cross rather than Lincoln)



and a Shropshire or Dorset Horn ram. With the latter you may depend upon having the ewes served at any time to suit the market. When the lambs are dropped it is necessary to feed them well, any check is fatal to the early development of a marketable lamb. In Buckinghamshire, England, my ewes were always on grass land in the daytime, with a sheltered yard at night. Until the lambs were ten days old, or longer in bad weather, hay chaff, with oats and beans was given to the ewes in troughs in the yard, with a few mangolds thrown on the grass land when feed was scarce, or snow on the ground. When the lambs began to feed, or at about a month old, I always gave them pea chaff and locust bean (the carob bean) in a small enclosure made with lamb hurdles, so that the ewes could not get in. The lambs were thus kept in a thriving condition, and, when lambed in January, would by Easter weigh 40lbs. each dressed weight when the demand for grass-fed lamb commenced, going on through May and June, soon after which these early-matured lambs became mutton, but were generally killed before then. The fat lambs for which the Dorset breeders were famous, and which were placed on the London market at Christmas, were housed and forced like hothouse grapes. This plan would not suit our climate, nor are the flock ewes bred in Australia suitable for the purpose; so I do not think it necessary to explain how it is done. I think my system, with modifications for climate, will suit the Adelaide market best. I have alluded to the necessity for keeping the lambs well and always going on.

MR. DAVEY: The Shropshire might be profitable; but in talking to a gentleman from New Zealand who is raising lambs for the London market, he said the Shropshire would produce good lambs for the market, but he advised not to keep them as stock.

A DELEGATE: I would like to ask what breed the Dorset is? I do not know of any in the colony, unless the sheep goes under some other name.

MR. SCRIVEN: I think my friend Mr. Melrose introduced the Dorset Horn sheep in the colony two or three years ago. He would be able to give you his experience of them in the colony.

MR. J. MELROSE (Uloomoo): I imported two Dorset Horn rams and ten ewes three years ago, and am very well satisfied with them. I tried the experiment last year of crossing the Dorset with the Merino ewe. I have shown them in Adelaide. Although they were not fat the people who saw them were pleased with the wool. I shall be very pleased to present one or two to the Agricultural College if the department would accept them. (Applause.) They resemble the Merino sheep to some extent, but they have bigger and squarer carcasses. I should think the sheep were full grown before two and a-half years old. Last season I scaled one of the sheep five or six months old at 129lbs. That sheep had put on 27lbs. weight in three weeks. But you can get all the information about the breed in the *Adelaide Observer*. This week's issue of that paper has an elaborate article about sheep-breeding—a whole sheet in fact. I have not any of the breed to sell. The small trial I have had with the Dorset cross with the Merino has been very successful. I sent a sample of the produce to Mr. A. B. Murray, of Magill, and others. I did not tell Mr. Murray what it was until afterwards. Mr. Murray said the meat reminded him more of the Scotch Highland breed of sheep—it was so very sweet and juicy.

MR. J. BROWN: Is the wool of the same quality as Scotch Highland sheep? Is it long wool?

MR. MELROSE: I do not know the Scotch Highland sheep; I have never seen them. The wool is very like that of a cross between a pure Lincoln ram and a pure Merino ewe, with the cross thrown a little back to the Merino. The wool is very free from grease. The sheep do not grow very heavy fleeces. The year I brought them out I had eight ewes; they dropped fifteen lambs. I believe

the breed is very prolific in other countries, and I am hoping to be able to do very well with them here.

The CHAIRMAN: Did I understand Mr. Scriven to say he got 150 per cent. of lambs?

Mr. SCRIVEN: Yes. The last four years I was sheep-farming I raised over 150 per cent. from all of my sheep, that is from pure Shropshires and Dorsets.

Mr. F. SALTER: My experience has been to cross between the Lincoln and the Merino, but I do not think we can do better in South Australia than put the Shropshire ram to good Merino ewes. I have bought a Shropshire ram, and shall probably try that cross. We generally put in the rams the first week in November, and you get them round in February. Last year I had early lambs. I think, to ensure successful lamb breeding, it is almost necessary to grow green crops extensively, such as sorghum, holcus, and lucern.

Mr. J. BROWN: We get good green feed in January. I have seen lambs sent to Adelaide up to about Christmas and fetch 15s. That was, of course, a long way ahead of our ordinary breeding of lambs. A gentleman in my district breeds lambs that generally come in rather late; they come in about March. He has a cross between the Lincoln and then he crosses the Merino on the other cross. He has done very well out of them.

Mr. D. G. STRIBLING: What is the special advantage, if any, in cutting lambs' tails?

Mr. DAVEY: I should like some person who has had a longer experience in sheep-breeding than I have had to answer that question. If you have the sheep to be shorn with tails on, the shearers will want to know "why the Dickens you have left the tails."

Mr. DAVEY: The younger you tail lambs the better. If you tail a lamb when it gets older it is very likely to bleed to death.

A VOICE: The difficulty is if you do not sell them.

Mr. MELROSE: I think every one will admit that it is best to tail lambs. The lamb is more sightly with the tail dropped. I do not mean cut to nothing. If a person loses many lambs through tailing, it is, I should say, through want of care. I have tailed many thousands, and lost a very small percentage indeed. I should recommend tailing when about a fortnight old.

Mr. SCRIVEN: In answer to the gentleman who asked what are the advantages of tailing lambs? In England I always marked my lambs before they were two weeks old; but in February the weather was often so cold and wet that it would be dangerous to castrate these feeding lambs until they were so old that the operation would cause a shock to the system, and give them such a check in their feeding, that in a few cases I have omitted the operation altogether, but if I failed to feed these lambs at three months old, I had no chance of selling them later; the grass in May would make them scour, and the flies are almost as bad as they are in the colonies. In London there is at Easter a demand among the Jews for Paschal lamb, which, according to the Mosaic law, "must be without spot or blemish." The lambs I have mentioned just satisfied the conditions; but whether there is any demand in the colonies for this class of lamb I must leave to the producers and consumers to settle among themselves. My experience taught me to endeavor to meet any demand, and not try to force the tastes of the consumers. I relied upon early maturity, constant progress, and a quick return. People in England will not buy lamb twelve months old, they call it mutton; but young lambs reared and fed as I have stated will always make freezers if the local markets are overstocked.

Mr. DALL: One of my neighbors said that tailing made no difference in selling. I think it is quite safe to send them to market, tails and all.

The CHAIRMAN intimated that the time had arrived for members of the Central Bureau to hear evidence from fruitgrowers on the codlin moth regula-

tions, and that, therefore, as there was no further business on the agenda paper, the Conference would close.

Mr. MELROSE: I am not a member of any agricultural Branch Bureau, but I have taken the *Journal* of the Bureau ever since it has been issued. I take a great interest in the work done by the different bureaus, and if there were more persons like Mr. Davey, to give their experience, we should be more successful than we are. I have very great pleasure in moving a vote of thanks to Mr. Davey for his paper. (Hear, hear.)

The GENERAL SECRETARY: I would like to add to that—"and all gentlemen who have taken part in making the Congress so successful as it has been." (Applause.)

Mr. MELROSE: Well, I do not care to move it, Mr. Molineux, because that would include myself. (Laughter.)

### Conclusion—Votes of Thanks.

Mr. W. C. GRASBY: I have very great pleasure, then, in moving a comprehensive vote of thanks to all, including the chairman. (Applause) The address which the chairman gave us at the beginning of this Congress was one worthy of our coming to the Congress to hear, let alone anything else. (Applause.) And I do not think that the papers have ever been exceeded for practical value and for general utility. I think that this Congress, as far as I have been able to judge—pressure of work has kept me away a part of the time—has been eminently successful, both as regards the quality of the papers and the educational results of our meeting. I move that a hearty vote of thanks of the members of this Congress be tendered to all those who have given papers in connection with it. (Applause.)

Mr. F. SALTER: I will second the motion. Apart from myself, I think our thanks are due to the gentlemen who have in any way assisted in giving us papers, and their presence at this Congress. I have been a member of the Bureau for some time, and am very glad to be in the work. The more people who take up the Bureau work the better. (Applause.)

The CHAIRMAN: I suppose Mr. Melrose is quite content to leave the motion as it is.

Mr. MELROSE: Certainly.

The motion was put and carried with acclamation.

The CHAIRMAN: Allow me to thank you, gentlemen, on behalf of those who have read papers and otherwise assisted at the Congress. Papers read here are the means of bringing out many opinions which we would probably never have heard of. Therefore it is of great importance to induce some of the gentlemen present to submit papers to our meetings.

The proceedings of the Congress terminated.

### PIG-BREEDING.

Pigs that are intended for breeding should not be fed along with those that are intended to be fattened for slaughter. Any animals—whether cattle, sheep, pigs, &c.—intended for market, should be fed all they will digest from the time of weaning until they are slaughtered. Animals intended for breeding purposes should be fed more moderately, and upon food calculated to produce muscle and bone. Animals that have once been fattened up for show are not best suited for breeding, as they never become prolific, and it is difficult to keep them in condition, nor do they last long. Boars may be used when eight months old, and sows at eight to twelve months.

Sows in pig should never be over-fat. Wheat-bran fed rather freely for about a fortnight before and after farrowing will prevent excessive richness in her milk, and thus obviate diarrhoea in the young pigs. Large fat sows are very likely to overlay their young. All over-fat animals are subject to deafness, and this is a common reason why sows overlies their young. The young pigs from a sow in medium condition will weigh more and be stronger at eight to nine weeks old than those from an over-fat mother.

The best results are always obtained from sows in medium condition. If in poor condition she may produce a greater number of pigs, but they are sometimes weak and often irregular in size. A fat sow will also produce weak pigs, and will give more or less trouble in raising them.

Not more than two litters should be taken from a sow during the year; and it is a question whether more than one should be allowed. Young pigs farrowed during the winter season always give a lot of trouble, and they are often pinched in their growth. Pigs farrowed in early spring, or even later, will thrive, and can be fed after weaning chiefly upon any good herbage.

Young animals always grow quickly when well fed, and will make much more weight upon a given quantity of food than can possibly be made by those that have completed their growth. For this reason, it is greatly more profitable to raise pigs to a weight of 80lbs. to 100lbs. than to bring them up to 150lbs. or more. Small pigs are readily saleable at a good price, but large overgrown animals are not in demand, even for making into mess pork.

Pigs are more cleanly than cattle or horses, if they have opportunity given them: but, being shut up in small styes, they have no alternative left but to be dirty. If their styes are well drained and "scavenged" regularly, the pigs will always use a distant corner.

Store pigs should always have some meal, milk, and "swill" given them, but may graze and grub for a large portion of their subsistence. They will thrive upon ensilage, or lucern, or any green stuff.

When penned up for fattening, no green feed whatever should be given for ten weeks before killing. Peas, beans, or meal, with plenty milk will produce pork of the very best quality. Sows must not be killed when "in season"—wait ten days, and kill then. To avoid any risk in this respect many people put the sow with the boar some time previously to killing, but this is in some respects objectionable.

## THE DAIRY.

### A Standard for Butter Production.

Every owner of cows is aware that some cows will eat twice as much as others and give only half as much butter, and that one cow may yield a considerable quantity of milk with not more than half the amount of butter fat in it that may be secured from the milk of another cow. These discrepancies must be rectified if the dairy herd is to be conducted on commercial principles.

The Adelaide Co-operative Society, Limited, has been very successful in raising the average milk-yielding capacity of its herd of dairy cows at Islington. They own ninety-eight cows, thirty-four heifers, twenty-three calves, and four bulls. For some years past there has been a continuous weeding out of the least profitable cows, and a careful selection of the best of the heifer calves, bred in part if not wholly from the best milking cows mated with pure bulls of well known milk-yielding families of cows. The results from this enlightened policy have been highly gratifying, and the average yield has gradually risen. In 1897 the average yield per cow was 471·3galls., showing a rise of 21·3galls. per head upon the average of the previous year.

In some of our districts in the North it has been stated that an average of only 200galls. per cow per year is the lowest that will pay. It is very doubtful indeed if so low a yield can be profitable. The usual average has been placed at 300galls., but this can be very greatly improved upon by the use of pure bulls selected from proved heavy-milking cows of dairy breeds, and mating them with the best cows of the herd. It is most important to bear in mind that the bulls must be pure breed, but the cows may be mongrels, so long as they are good milkers. From the progeny of this union the best and heaviest milkers should always be selected for further breeding.

Mr. Wm. Kerr, of Parwan, Bacchus Marsh, Victoria, says: "Everyone who keeps cows should know exactly what each cow in his herd is capable of producing," and should fix a butter standard, and make it a point to keep not one cow whose weekly record falls below that standard. By the use of a bull whose ancestors were famed for their butter records, and by careful selection of their heifers, bred from only the very best butter cows, he has raised the average per cow to 340lbs. or 350lbs. per annum. The standard aimed at is an average of 10lbs. per cow per week for eight months. He advises not to fix too high a standard at first, but to keep on weeding out the worst cows and keep raising the standard higher and higher. In time it will be found that one-half the number of cows will give as much butter as the larger number did before culling and selection. Judicious feeding also has much to do with the abundant yield of butter.

Another important thing to remember is that no cow can yield plentiful and rich milk if she is not provided with the necessary quantity of nutritious food to manufacture into milk.

A paragraph in a recent issue of the *Farm and Home* states that the average annual product of milk per cow, where the animals are well fed, is as follows:—Ayrshire (Scotland), 900galls.; Scandinavia, 855galls.; Canada, 700galls.; England, 550galls. For Australia the average is placed at 275galls. per cow yearly. This shows that there is very much room for improvement in Australia, especially when it is considered that stall feeding and winter housing are absolutely necessary in the colder countries, whilst in Australia the climate is so mild all the year round that no one thinks of housing the cows at any time, and not much provision is made for them in the way of preserved fodder, oil cakes, and the like.

At a meeting of farmers held at Alliance, State County, U.S.A., last January, Mr. Thos. A. Crawford stated that there are herds of cows in the States that average 400lbs. and above per cow of butter annually, and herds in nearly every community in the dairy sections that average 300lbs. per cow annually.

The "Handbook of Experimental Station Work," published by the U.S. Department of Agriculture, gives the results of many instructive experiments. It is shown that the first portion of milk taken from a cow at each milking is relatively poor and increases in richness by the strippings. Milk is richer in fats when cows are milked rapidly—in three to four minutes. "It was found that cows which ordinarily gave milk with 4 per cent. and 5 per cent. of fat respectively, gave milk with only  $2\frac{1}{2}\%$  and  $3\frac{1}{2}\%$  respectively, when milked one teat at a time." Each cow should have her regular stall, be milked by the same milker at regular hours night and morning; there must be regularity in feeding, watering, salting, and all work connected with the cows. A silo is a great help to the economical production of milk; thousands of successful dairymen have proved this; it is no longer an experiment.

Sweet ensilage can as readily be made in the pit as in the stack; but, for milking cows there is little doubt that sour silage, or moist silage, is the better food. The process of ensiling rather decreases the nutritive proportions

in the fodder, but the heating or sweating adds to the digestibility, so that silage is, after all, more beneficial to the cows, and more quickly assimilated than dry hay. The greater variety of nutritive plants there may be mixed in the silo, the better will the livestock appreciate it. All plants intended for ensilage should be cut soon after the flowers have given place to seed pods, and before the seeds are half grown, except in the case of maize and sorghums, which are best when the seeds begin to glaze or harden. In pit ensilage it is best to chaff the stuff into the pit, packing it well at the sides. This also applies to the long stuff used in stack ensilage, it should be well packed outside. For stacks, let the fodder become wilted on the field; for pits, cut the stuff and leave it five hours before carting in—the fodder cut in the afternoon can be left till next morning. The temperature for sweet silage should be allowed to rise anywhere between 120° F. and 135° F., if below 115° F. the silage will be sour. The temperature must be allowed to rise above 100° F., otherwise the fodder will spoil. By putting sufficient weight or pressure on top, the rise in temperature is stopped, fermentation ceases, and the fodder is preserved until air is again admitted, when the process of fermentation recommences. The green fodder put into a pit or stack to a height of 12ft., will gain sufficient heat during the night to allow of a fresh layer of 12ft. being added next day, and this will compress the first layer till it is only about 4ft. deep. When the stack is high enough, or the pit is full, some planks or poles should be laid on top, and a good lot of weight or pressure put on, to prevent the access of air amongst the fodder. It will be found that an average cubic foot of ensilage weighs 40lbs.; at the bottom of a pit or stack of 12ft., a cubic foot will weigh about 50lbs.; whilst from near the top it will weigh, perhaps, about 34lbs. Silage, and similar odorous fodder, should always be fed soon after milking, not before. Pit silage cannot catch fire, and it is difficult to set fire to stack ensilage; but there is plenty of danger from fire in connection with haystacks.

## THE FARM.

### SEASONABLE NOTES.

*Written for the "Journal of Agriculture and Industry."*

By W. LOWRIE, M.A, B.Sc., PRINCIPAL ROSEWORTHY  
AGRICULTURAL COLLEGE.

### Sorghum.

Last month the cultivation of some of the fallow crops suitable for one or other of the districts of this colony was discussed. Potatoes, mangolds, kale, rape, and maize offer a wide variety for selection for those districts where the rainfall is sufficient. But sorghum is, I take it, our most generally useful summer crop, and in average years sorghums or millets grow well over a wide range of our arable land. They will thrive on poorer soils than those heavier yielding crops mentioned above, and a smaller rainfall suffices for their success. From Mount Remarkable southwards, there are extensive belts of country suitable for this crop, and the stock-carrying capacity of very many farms could be increased profitably by giving it more attention. Part of the fallows should annually be sown with one or other of the varieties of sorghums or millets, and in most years excellent forage for cattle and sheep would be secured for the months of February, March, and April. It is in no sense as a main crop that it is recommended; though there are, I recognise, circumstances in which it would be as profitable as a cereal crop now and again occurring. It is as a fallow crop, to be fed down on the land and to be followed by wheat or other winter crop, that it is specially useful.

The plant was grown originally in China, East Indies, and Africa. It develops more slowly than maize. It likes soils of a medium character, but grows well on average mallee land, brashy limestones, or sandy soils. On stiff soils, where the surface cakes hard, it does not do well in our climate. Like other crops, it does best on a rich soil, but it will nevertheless thrive fairly on soils comparatively poor or exhausted somewhat.

The *Cultivation* is such as every careful farmer will give to his fallow land—such as has been indicated in former articles. The land will be worked down to a fine tilth in September, October, or November, according to circumstances and situation, and on this the seed will be drilled in from 24in. to 36in. apart. It is a good plan to steep the seed for twenty-four hours at least before sowing, so as to hasten germination. We prefer 36in. to 24in. as the width between the rows; and the drier the district, the thinner should be the seeding.

The varieties of seed generally grown are—1. Early Orange cane. 2. Early Amber cane. 3. *Holcus saccharatus*.

The Americans speak favorably of these varieties :—Folger, Collier, McLean, and Colnan. Folger is the result of a cross of Early Amber cane and Link. Collier is recommended as best for districts where the climate is cooler. It grows less luxuriantly than the Folger, but gives a very luxuriant herbage, nevertheless. The McLean variety came originally from Queensland, and is named after the energetic Secretary of Agriculture in that colony.

Planter's Friend is another of the varieties which finds some favor in South Australia. It is good practice to sow blocks of as many of these varieties as can readily be obtained, as they will all grow more or less successfully in our average districts, and a succession of forage is thus obtained, seeing that they ripen at different times. In addition to these sorghums, I would recommend for trial Pearl millet, on sandy or lousy land, if possible; and Johnson grass, on poorer, dryer, lighter places. When sown broadcast, 5lbs. to 6lbs. to the acre is sufficient for the sorghums or Pearl millet; but 8lbs. or 10lbs. of Johnson grass is required. It is difficult to sow so small a quantity accurately broadcast or even drilled, and it will be found advisable to mix the seed into fine bonedust sufficient to enable it to be distributed regularly. But drilling is by a long way the preferable mode of sowing, and when sown in this way, only two-thirds of the quantity of seed recommended above is required. It is highly desirable to put the seed in deeply. Many farmers find "ploughing in" one of the most successful ways of planting the seed, the ploughing being from 3in. to 4in. deep. When drilling, use pressure on the coulters sufficient to cover the seed to a depth of 3in. It thus is down in the moist soil, and germinates more regularly. It is marvellous what droughts the plant will withstand if it once gets fairly going, and to secure this good start, putting it in deep is one of the surest ways. As a rule sorghums are not manured directly, but I am inclined to the belief that, in so far as there is not the slightest fear that our soil will be leached during the summer, and of course no risk whatever of manurial matter being carried away in under-drainage, as fortunately we require no under-drainage, that it would be advisable to sow the manures intended for the succeeding wheat crops with the sorghum, so that that plant may benefit a little from it, and at the same time the manure may be nicely mellowed in the soil for the winter crop. Farmyard manure is out of the question, as it would simply foul the land which has been cleared by the winter fallowing. Artificial manures should alone be used. If bonedust is the manure favored by the farmer for his wheat, he should certainly select it for application with his sorghum; and if he apply, say, 2½cwt. to the acre, he will find it come into excellent use on the succeeding wheat crop. We prefer, in this district, the more soluble manure, as the rainfall is so light, and of these good superphosphate is ever

found the most efficient on our land, which is average mallee country; 2cwt. of superphosphate is sufficient to the acre, but if the land is light in character, and has been severely cropped, a mixture of artificial manures will be found more efficient. A good mixture would be 1½cwt. of superphosphate, 1cwt. of a potassic manure, such as muriate of potash, and, say, 90lbs. of sulphate of ammonia, or nitrate of soda, to the acre. This is an expensive dressing, but we know from experience that it will pay handsomely on the succeeding hay crop. A mixture of the same quantity of superphosphate with 2cwts. and 3cwts. of wood ashes, and the same quantity of nitrogenous manure to the acre, will be found practically to work out well, though chemically it appears injudicious, inasmuch as the salts of lime in the wood ashes will revert the superphosphate.

The *after-cultivation* of this crop is most important. Shortly after its germination it should be horsehoed with a chisel-tined horsehoe, and this should be repeated at intervals during its growth. If these horsehoeings be carefully carried out the land will be kept clean, the moisture will be retained for the crop, and it will benefit accordingly. As the crop gets higher the cultivation should be lighter, and consist of a mere scuffling to break the surface crust. In our long dry summers we cannot give too much attention to the value of incessant surface cultivation. In the early stages of its growth sorghum is too bitter to be relished by stock, and they should not be turned into it until it begins to flower. They should be turned in only for a short time for the first day or two, else acute indigestion may be provoked and stock lost; but after a day or two they can be left on it altogether. It is an excellent feed for lambing ewes; horses do well on it in the "off" season, and it is one of the most valuable foodstuffs available to us at that time of the year. It does not produce the same quantity of milk that some more succulent forages might secure, but it gives firm butter, good in color and excellent in quality. The cows are inclined a little bit to put on condition rather than increase in milk yield on it; but in my opinion this is an advantage, as it enables us to start the winter with stock in nice "bloom." Grazing the crop is much to be preferred to cutting it and feeding it off the land; practically nothing is wasted by grazing it, the field is not impoverished, and much labor is avoided. In the autumn all the working that will be necessary for the wheat crop will be a good deep cultivation of chisel-tined cultivator after the rains have set in, and a good scarifying when the weeds have germinated, preparatory to sowing. This dry season unfortunately offers but little inducement to sowing summer crops up to date; nevertheless, we think it well to put in sixty or seventy acres in the hope of a good thunderstorm or occasional rainfall later. This costs little, and if such rain does come, a wealth of autumn forage will be available.

### Ensilage.

This is the month for silage-making. Nearly every farmer has somewhere on his holding some luxuriant herbage, self-sown crop, or little bit of dirty hay crop, which it will pay him well to convert into silage. Some men will have sown a mixture of cereals and legumes purposely for silage, and I will, therefore, briefly indicate what I consider the best means of making it.

First—Cut after the crop has bloomed, and a week or so earlier than for hay.

Second—Allow the cut forage to lie for a day, more or less, according to the amount of moisture in it when cut.

Third—Chaff into a pit, and fill the first 4ft. or 5ft. only. Then stop until the temperature has reached 125° at least. (This temperature can be readily taken by means of an iron tube, drawn to a point at one end, down which a thermometer may be let by a string, to be drawn up and read at intervals.)

Fourth—When the temperature has reached 125°, go on again, and if it is found to be going above 150°, pile on the stuff as quickly as possible, so as to



check the rise. The second 4ft. or 5ft. will be found to do this in most instances. Await rise of temperature in this next addition, and then go on again until the pit is full. Let it settle down, then fill up again as before, and in the end cover it with a layer of straw, and put on weights, such as logs or stones, until the pressure is from 80lbs. to 100lbs. to the square foot.

If the temperature is found rising to over 150°, put on more weight.

We use here kerosene tins filled with concrete, in which wires have been fixed as handles, as weights, and find them cheap and convenient.

If this course be carefully followed in silage making, it will be found to give sweet silage, such as would rejoice the heart of any dairyman, as a feed for his cows when other succulent forage cannot be had.

## POULTRY.

### DISEASES OF POULTRY.

By D. F. LAURIE, POULTRY EXPERT

(Continued.)

Overfeeding is the cause of many diseases in poultry of all sorts, especially fowls. It is even worse to overfeed than to half starve the birds. Want of method in feeding makes all the difference between profit and loss. If you have hens of a good laying strain, the constituents of their food must be egg-producing, and the quantity given must be no more than the bird requires to keep in health and lay the greatest number of eggs. If the birds are too fat, they will not lay; if, on the other hand, they have only sufficient food to keep them alive, there is nothing to spare to form the egg. In examining hens—many die if too fat—such extensive accumulations of fat are found, that the internal organs are so cramped for space that they cannot perform their proper functions. Immediately the muscular tissues are encroached upon by fat, the general powers, especially the respiratory, are weakened, and, in consequence, organic mischief arises. Fatty degeneration is often the forerunner of disease of the egg-producing organs; rupture of the oviduct—the substance of which becomes soft—is often a result, of course, fatal. Over-fat fowls become very inactive, and the organs of respiration, &c., are unable to throw off the poisons accumulated in the system; the liver and kidneys are invariably affected, often to a very serious extent. Of course there are many gluttons among poultry; these eat greedily, far more than their share, and seldom, if ever, give any return. If profit is to accrue, it is needless to say that such birds should be killed. Some people might say, "Sell the bird to someone else"; but it may be pointed out that such should not be perpetuated. We only get good layers by careful selection and breeding. Far too much concentrated food, such as grain and meals of various sorts, is given to poultry. It has been found that to keep the digestive organs in perfect health, bulk, as well as quality, is required. Change of diet is also most necessary; it does not do to continually feed on wheat or on any other grain. When changing the food it must be remembered that the constituents of different grains vary; some contain certain properties to a greater degree than others. A great authority has said:—"Dieteries ought never to be estimated by the rough weight of their constituents, without distinct reference to the real nutriment in these, as determined by physiological and chemical inquiry." Cleanliness in feeding poultry is to be scrupulously observed; feed only on sound wholesome food, and do not imagine that it will be improved if thrown on dirty ground, so that the bird eats filth. Do not give mouldy or sour food, and avoid tainted meat as a deadly poison. Green food of some sort must form an important portion of the daily food—apart

from its nutritive properties. it corrects many morbid conditions of the digestive organs. The successful poultry-keeper makes it his business to find out the condition of each individual bird, so that if too poor, or too fat, he can treat accordingly.

On all occasions it must be urged that the giving to poultry of egg foods, spices, pepper, &c., is highly injurious. Certain condiments are admissible occasionally, medicinally, but not for the purpose of stimulating the birds to lay. One often sees flaming advertisements of so-and-so's patent egg foods at so much per packet. They are all either worthless, injurious, or both. A very great portion of most of them is composed of crushed bone, sea-shells or oyster-shell, not the sort of things to buy by the ounce or tin. To these they add cayenne, gentian, ginger, mustard, ordinary pepper, or some other heating substances. The invariable results on the bird itself consequent on using such rubbish is disease; most frequently the liver is affected. In other cases the egg-producing organs are affected and become diseased, and the hen is either useless or dies. If the matter ended here it would not be so bad, but the fact is, chickens bred from affected stock are most liable to various diseases. They are deficient in stamina, and the first severe change, accompanied by wet weather, causes numerous complications, such as pneumonia. "Going light," or the gradual wasting away of young birds, is caused by liver disease, and is often the result of improper feeding of the parents. People who make money by selling such nostrums may object, but the whole world of poultry experts and medical men is against them—theory and actual practice. Proper food, green food, and water, sufficient space, shade, and shelter, soft ground to scratch in, grit, and gravel, charcoal or wood cinders, as an aid to digestion, and in addition, shell, forming material—that is, some pure form of lime, such as shell or bone dust—are all suitable for poultry, and only provide all the necessities for egg production without undue stimulation. Too much rich food is over-stimulating, and should only be given to such birds as produce eggs for market, and not for breeding.

Thoughtful breeders have come to the conclusion that the great aim is to breed strong, healthy chickens, full of stamina and vitality. Now, to a large extent the chick derives its vitality from the hen. It stands to reason that a hen for breeding should be fed to produce quality rather than quantity. Always breed from your best layers, if egg-producers are required; therefore, after proving a pullet to be a good layer, transfer her to the breeding-pen and feed on non-stimulating food, and in moderation. She will probably lay a less number of eggs, but the chicks from these eggs will be strong and hardy, and will develop into fine specimens. The proper feeding of poultry is a little understood and much neglected item in the industry. An expert of considerable experience can tell the difference in a mob of young chickens between those bred from improperly fed hens and judiciously fed ones. Many cannot or will not admit the reasoning of this subject, yet the facts remain. Want of proper attention in this direction is the cause, directly or indirectly, of most failures in poultry-raising. Some of the results are:—*Congestion of the liver*: Symptoms—Depression, irregular and bilious evacuations, impaired appetite, and sickness, with occasionally slight enlargement and heat at the bottom of the breastbone. *Inflammation of the liver*, of which the following are the main symptoms—Tenderness on external pressure, sometimes enlargement of the abdomen, great depression, bilious diarrhœa or dysentery, quickened breathing, rapid emaciation, yellowish skin, great thirst, and loss of appetite. Sometimes the bird is lame in the right leg. *Hypertrophy*, or enlargement of the liver, is caused by high feeding and want of exercise; bilious evacuations ensue, ending in diarrhœa and death. *Atrophy*, or wasting of the liver, in which, in addition to other symptoms, the bilious evacuations become black or blood-stained at the

last, ending in stupor and convulsions. Of course, all these can be treated, and with apparent success; still, even when recovered to outward appearance, such birds are unfit to breed from. Owing to the high prices of wheat, &c., of late, the practice of feeding largely on maize has become very general. Maize has a great tendency to cause large accumulations of internal fat, and is consequently very unsuitable for continuous feeding; it should be used with moderation. I have of late seen several cases where defects and disease are plainly attributable to this food. The cheapest is not always the best.

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## FORESTRY.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

The production of timber for all the varied purposes to which it can be applied is, from a practical business standpoint, probably the most important object in connection with forest operations. This may, perhaps, be generally admitted when dealing with the question in the abstract; but when it is urged that there ought to be far more energetic action taken to increase the production of timber in the colony, either by conserving the natural growth or creating artificial forests by systematic planting on a large scale, the argument will at once be advanced that it is quite useless to produce timber here, because all demands can be supplied far better from outside sources, and therefore it is absurd to carry on an undertaking that will ultimately prove futile. Now, statements of this kind are generally made by persons who possess only a very superficial knowledge of the subject, and who are practical illustrations of the truth of the proverb that "A little knowledge is a dangerous thing." It is very easy indeed for estimates of forest areas to be largely exaggerated when inspected by travellers not experienced in such matters, and very improbable that the true value of the timber will be ascertained by those who are not practically acquainted with the various indications by which the quality of such timber is known by skilled woodmen. Hence it generally follows that ordinary travellers are so impressed with the imposing spectacle presented when passing through a fine forest area that the actual extent of the timbered country becomes greatly magnified in their estimation, and the supply of timber is often spoken of as inexhaustible. Were they, however, in possession, on the other hand, of some information as to the immense drain continuously made on all the supplies of timber, from its many varied sources, they would soon see reason to modify their opinion as to the inexhaustible nature of any timber supply. As this question of timber supply is one which frequently attracts considerable attention, it may be of some service here to place on record some of the statements made and facts referred to by various authorities, from which it will be open to all to draw their own conclusions.

In an article on "Preservation of Forests," which appeared in the *Timber Trades Journal* for September 29th, 1894, the following statements occur:— "That the threat of a timber famine within a measurable distance of time is no idle one can easily be proved by a few figures. If the forest area of Europe and the United States be taken at 1,400,000,000 acres, and the annual consumption of timber of all kinds clears the timber off 23,000,000 acres, the whole would be used up in two generations, unless an equal quantity was being continually reproduced. But at present nothing like an equal quantity is being reproduced. This calculation has not taken into account the supplies from the forests of India and Australasia, nor the untouched resources of Siberia. But the Australasian forests are rapidly disappearing before the axe of the colonist and the careless lumberman, and the development of the Indian and Siberian supplies will be largely used up in the constantly increasing demand for timber

all over the world. It may be imagined that the use of iron and other substances in the place of timber has diminished our need of timber, but it is not so. The United Kingdom now consumes five times as much timber as it did a century ago, and the difference is not due to the increase of population, for the percentage per individual has nearly doubled. Thus, what with the clearing of forests for the purposes of colonisation, the reckless and unnecessary destruction of forests where the land is not wanted for agriculture, the ever-growing consumption of timber, and the neglect in many countries of securing an adequate reproduction of timber, the relation between the demand and supply of timber is yearly becoming more critical."

Not only do the foregoing remarks tend to show how unreliable any opinion is that reckons the supply of timber at present existing inexhaustible, the facts as to the increasing demand for timber which has sprung up almost within the last decade for use in connection with wood pulp for paper-making also show how the ever-increasing drain thus created will result in further lessening existing supplies.

Mr. S. P. Eastick, in a paper on "Chemical Wood Pulp," read before the Imperial Institute in March, 1895, stated that "in the United States in 1886 97,000 tons of wood pulp were produced; while in 1894 the quantity probably exceeded 1,000,000 tons, worth £5,000,000. In the United States alone 500,000,000ft. of logs, representing the destruction of 100,000 acres of forest, are now annually utilised for pulp manufacture. It is estimated that the daily editions of the *New York World* absorb about seven acres of an average forest. Although originally intended for the manufacture of paper," he further adds, "wood pulp has been largely adapted to other purposes. By various methods of indurating and otherwise treating the pulp, it has been successfully employed for the manufacture of all kinds of furniture, of carriages, wheels, portmanteaux, kitchen utensils, barrels, waterpipes, floor covering, doors, buildings, and ornaments, and in the U.S. Navy for protection purposes."

With demands of this kind growing by leaps and bounds, it is not surprising to find that the anxiety existing in the United States as to the capacity of the forests for supplying the timber required led to the desire for information as to the state of the pine timber supplies, with the result that the Senate passed a resolution in April, 1897, calling for a statement on the subject. Through the courtesy of the Department of Agriculture, Washington, a copy of the report, furnished in accordance with the foregoing resolution, has been received by the Forest Department of this colony. In this report the compiler, Mr. B. E. Fernow, Chief of the Division of Forestry, an authority of great weight, fully attests the gravity of the question by the remarks he makes. After giving careful details regarding the existing timber in various States, he finally places the estimates of all coniferous timber available in the Eastern United States at 400 billion feet, and the annual demand on it as from twenty-five to thirty billion feet; from which data he advances the statement that not fifteen to twenty years' supply can be on hand in the Eastern States. He subsequently refers to the coniferous growth of the Pacific Coast; and even assuming that supplies, spite of distance, will ultimately come from there, he points out that if this source be reckoned at 1,000 billion feet now standing, with a yearly cut of four billion feet, and these figures be added to those obtained for the East, giving, at the best, only 1,400 billion feet standing, and a cut of at least thirty billion feet per annum, there would appear to be, under most favorable contingencies, not more than forty to fifty years' supply in sight! In considering the question of meeting the difficulty by importation from abroad, he further shows that Canada, the only possible source of supply, can render but scant aid; seeing that, assuming her supply now standing, including that of New Brunswick and Nova Scotia as well, to be seventy-five billion feet, still Canada's

cut alone of five billion feet will exhaust it in fifteen years' time. He finally concludes with the following remark:—"It will be evident from these statements that our virgin coniferous supplies must share the fate which the buffalo has experienced, unless a practical application of rational forestry methods and a more economic use of supplies is presently inaugurated. Since coniferous wood represents two-thirds to three-fourths of our entire lumber consumption, and its reproduction requires more care and longer time than that of hardwoods, the urgency of changing methods in its use and treatment will be apparent."

Now, when we remember that the American forests are invariably referred to as the great source of supply for timber, remarks of the preceding character are very far from encouraging, and most certainly emphasise the wisdom of preparing for future requirements, to some extent at least, by taking action wherever possible *now*, while timber still remains for a few years, instead of adopting the *laissez faire* policy of letting the matter go till the timber is gone too, and then experiencing the sudden awakening to a common-sense view of the question that will force itself upon the public mind under the infinite number of serious drawbacks that will inevitably present themselves during the necessary time that must elapse ere trees can be planted and timber properly matured for economic purposes.

The danger of a timber famine might not perhaps be quite so great were it not for the fact—all too well known to those at all acquainted with the exploitation and conversion of timber all the world over—that the lumber man, woodcutter, sawyer, splitter, or other timber-getter, by whatever name he may be called in various countries, possesses at all times an ineradicable tendency to study his own personal interests before he troubles himself about the value of the timber to the State. The one thing impressed on his mind is that the quicker he can fall his tree, the more trees he can fall per diem and the more dollars he can earn! Hence he goes straight at it the quickest way! What does it matter to him if, in falling, the tree smashes up some fine young trees that, though as yet too young for his work, would in a few years replace these he will fell! It is too much trouble to take the requisite precaution to throw his tree where it will do no harm; and so many a score of fine young trees are ruined day after day by various timber-getters. But the mischief is not confined to cases of this kind. When his tree itself is down, he will take only such logs from it as can be obtained by the least possible cutting; and, as likely as not, will leave half the timber to rot because it would require an extra saw cut or two to get all the marketable timber away; and every cut extra he thinks a cut wasted, which might be felling another tree. This mischievous tendency shows itself in another way sometimes, for, in procuring some classes of timber, he may find it, he thinks, quicker to fell a number of young trees standing close together, and only take *one* short length from each, leaving by far the larger portion to rot on the ground, rather than go farther afield, taking one here and there of suitable height, to cut with no waste where they could be removed with advantage to the remaining timber. No, it is easier and better for his own personal interests to get the timber as quickly as he can, and as close together as the trees can be found, for this will save hauling, and hauling costs money, and the more he has to pay for hauling his timber, by bullock or horse team, the less he gets for himself. What cares he if his carelessness wastes and destroys in the most ruinous manner forests that have taken generations to grow. Great statesmen say "*Après moi le deluge*," and, though he doesn't understand French, he understands his own interests as well as they do theirs, and why should not he look after them, regardless of future timber scarcity? It is easy to see, therefore, that, without sufficient oversight—which in many forests has been totally wanting—the amount of ruthless destruction to be found in the path of the timber-getter is very great, and, even in the comparatively open forest areas in

this colony, after many years of extensive observation while in charge of forests where considerable timber operations were in progress, the writer feels amply justified in expressing the opinion that little more than one-third of the timber in sight in a given area of forest country becomes ultimately available for economic purposes when waste in falling, waste in conversion, and destruction through fires are duly considered. The damage from this last source is in some instances simply appalling, and very difficult to properly estimate, seeing that, in addition to all timber actually consumed by fires, large numbers of trees that remain standing, and possibly seem unharmed, ultimately develop some defect internally, such as heartshake, and thus the quantity of valuable timber obtainable therefrom becomes greatly reduced. Much more might be stated to show how little reliance can be placed on any view of the timber supply that continues to regard existing forests as inexhaustible. Sufficient has already been advanced, however, to prove that the question is one of far too serious a character to be trifled with, and that every effort should be made to conserve all timber wherever possible, and to supplement the want of it in timberless districts by planting on an extensive scale where the existing conditions will admit.

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## THE VINEYARD.

### NOTES AND HINTS FOR OCTOBER.

*Written for the "Journal of Agriculture and Industry."*

By ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

#### Soil.

Scarifiers and horseshoes should be kept going throughout the course of this month, so as to level down the soil, reduce it to a fine tilth, and destroy the weeds that may have sprung up on the ploughed ground. Should the soil have previously received two good ploughings it will not be necessary to drive the scarifiers to any great depth; their rôle is not to rip up the soil, but to put it in such a condition as to enable it to retain as much as possible of the moisture acquired in winter. On the other hand, should any patch of soil have become hardened on the surface, or invaded by weeds to such an extent as to interfere with the good working of the scarifiers, it will save both time and money to plough it up a third time. One good ploughing would do more good than three or four scarifyings.

#### Nurseries.

Nurseries of rooted vines should be carefully horsehoed during the course of this month, to loosen the surface soil and destroy weeds.

#### Disbudding.

Where disbudding is necessary, it should be practised early. At this time of the year the superfluous shoots are easily removed from the vine with the fingers, and they have not yet had time to injure the more valuable shoots.

#### Grafts.

Grafts should be visited, and suckers suppressed from the stock, and rootlets from scions.

#### Oidium.

In the early stages of its development, which occur during the course of this month, the effects of this disease are not apparent to the naked eye. Early sulphuring, irrespective of its apparent presence or not, should never be neglected, as it will nip it in the bud. Vines should be sulphured as soon as the shoots are about 4in. to 6in. in height.

### Vine Grubs.

Those who have planted new areas in vines will soon have to be on the lookout for the little vine grub, or caterpillar of one of the *Agrotis* moths. The delayed broods that had no time to change into chrysalids the previous summer remain buried in the ground, in a semi-torpid state, throughout the winter months. On the return of warm weather they issue from their subterranean lairs, seeking what vines they may devour. They are very ravenous at this stage, no doubt under the influence of their prolonged fast; shortly afterwards they pupate, and issue as moths in November. It has several times come under my notice that these delayed broods appear in large numbers after a comparatively dry winter. Their tissues are soft and easily affected by the slightest contact, and as they hibernate in the superficial layers of the soil, many are destroyed when heavy rains prevail. The chances, therefore, seem in favor of the early appearance of large numbers of these caterpillars. It must be remembered that by killing them at this stage not only are the vines protected for the time being, but also from numerous other grubs which would indubitably appear later.

As soon as their first appearance has been noted, place round each vine about a teaspoonful of the following mixture:—Bran, 30lbs.; treacle, 5lbs.; Paris green, 1lb.; water,  $\frac{1}{2}$ gall. Dissolve the treacle in hot water, stir the Paris green into the liquid, and then incorporate the whole with the bran. It is not advisable to place the Paris green too close to the stems of the vines, as it appears to do some injury to the bark.

## ORCHARD NOTES FOR OCTOBER.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

Where it has not been done already, the cultivation of the soil should be completed at once, as the large sods will not pulverise if allowed to become baked hard. Many orchardists this season have been thrown behind in this work owing to the poor condition of their stock, but every effort should be put forward to overcome this defect at once. Should heavy rains occur, the cultivator ought to be put through again to break the surface.

In small gardens, or where the expense can be undertaken in orchards, newly planted trees should be mulched with broken straw litter, seaweed, or manure. The next best mulch is obtained by pulverising the soil around the trees, and stirring it afresh after every rain shower or artificial watering. In the cultivation of the citrus tribe there is very little doubt that the application of a mulch of this character, with less frequent irrigation—the natural result—more solid and better flavored fruits can be obtained. Should dry weather continue, where mulching is not practised it may be necessary to water many trees, but this must depend upon position and other conditions.

Towards the end of the month, after the "drop" has taken place, the thinning of apricots may begin. This is a very necessary work which is much neglected here. It is difficult to lay down any rule for this work, but where there are several fruits on a spur, say, 6in. long, only two should be retained; but the surrounding spurs should be considered, and if there are non-fruited growths immediately above or below the one to be operated upon, more fruits may be left. If, as often occurs, two fruits grow closely together on a spur on which no others are growing for, say, 4in. or 5in., then allow the two to remain. The whole subject resolves itself into one of how much the tree is able to carry this season, and at the same time not be weakened so as to cause a shortage next year.

Summer pruning should begin now. If a fairly large limb has been cut from an apricot tree, it will generally be noted that the three or four top buds will throw out growths of almost equal strength; and should these be all left a tufty matted appearance will be given to the tree, and the next winter much heavy pruning will be necessary. To avoid this, and to direct the energy into desirable channels, the growths necessary to promote the future shape of the tree should be selected and left untouched; the others should either be rubbed out entirely or pinched back: if they promise to fill the centre of the tree, complete removal is best. Any shoots which grow out of the old bare arms nearer to the ground than the present fruiting wood should be carefully guarded, and as they become fairly hardened—that is, lose their brittle sappy nature—they should be cut or pinched back to cause them to branch afresh. By this means—as in re-forming old vines—the trees in a few seasons may be re-formed and reduced in size without any loss of fruit during any particular year.

Young trees should be gone over carefully and disbudded, so as to place what are to be the permanent main branches desirable distances apart along the trunk. If any individual growths left for this purpose outstrip the others in development—usually the top ones will do this—they should have the extreme terminal bud nipped at intervals, so as to check the growth temporarily to the benefit of the more backward ones.

The setting out of citrus trees may be carried on safely where water is at hand, and more especially where the trees have only to be carried short distances.

The small trees that have been left unselected from the nursery beds, but are yet healthy, only having been discarded by buyers on account of the size, will prove best, because they can generally be lifted with the roots almost entire. Should they be “bagged” the bag may simply be spread out in the planting hole, and not dragged from beneath the ball of earth if the latter is likely to fall apart by the shaking. The trees should be watered immediately, and a mulch put over the surface for several feet around, as soon as the water has soaked away. Any young sappy shoots on the points of the twigs will shrivel up and die if allowed to remain; they should therefore be nipped off at once down to firmer wood.

For other suggestions on planting I would refer our readers to September issue.

The budding or grafting of citrus trees may be undertaken now.

Many amateurs experience difficulty in cutting buds from these trees on account of the ribbed or triangular shape of the young shoots, but buds should be taken from lower down upon the shoot where the growth is more rounded. If a very thin slice be taken beneath the bud with a very sharp knife, and no bruising done, there will be no need to take out the thin slice of wood before inserting the shield.

The growths from buds inserted into old trees last autumn will now start away, and in proportion as they grow so should the other growth from the stock, or undesirable sort, be rubbed out. It will generally be necessary to stake these young shoots, or they will snap off during windy weather. The grafting of deciduous trees may yet be performed on the rind or bark grafting method, with greater hopes of success than any other.

The planting of Guavas and Passion fruits may be done now. The former fruit, though not a commercial item here yet, is worth growing on a small scale for the grower's own use; the jelly made from this fruit is very excellent; and, though of a tropical nature, some of the species fruit freely around Adelaide.

The codlin moth will begin to emerge from its winter stage early this month on the plains country, and efforts should be made to check it. Spraying with



Paris green are recommended as soon as the young fruits are formed, and thus on at fortnightly intervals. A strength of 1oz. of best Paris green (Blundell's) can safely be used to each 10galls. of water, into which about  $\frac{1}{2}$ lb. of freshly slaked lime should be strained.

The black aphides of the orange and peach will now become troublesome, and no time should be lost in suppressing them. On trees of moderate proportions I believe that fumigation will eventually be adopted, as being more thorough in its effects.

Sprayings with tobacco and soap wash, kerosine emulsion, and resin wash are all well proved remedies, but they must be applied with intelligence, always considering the breeding capacity of the insects treated. As far as practicable the sprayings for peach aphides should be repeated several times at intervals of not more than forty-eight hours, until the pest is repressed, for the simple reason that it is useless to spray at weekly intervals for an insect which gives birth to living young ones which mature and themselves reproduce within a week.

Scale insects will also begin to reproduce rapidly, and spraying should be done for black scales; but not much will be gained by spraying just now for the destruction of the red scale of the citrus trees. The resin wash is undoubtedly the most efficacious and cheapest wash we have here for scale insects.

## PURE PARIS GREEN.

In order to ascertain whether dealers in Adelaide are selling pure Paris green, samples were purchased for analysis, unknown to the sellers. These samples were submitted to the Government Analyst and Assayer, who reports that they yielded, under analysis, as follows:—

Number of Sample.	Copper Contents.	Arsenic Contents.	Purchased from—	Price per pound.
1 .....	24.2 per cent.	43.4 per cent.	A. M. Bickford & Sons.	s. d. 1 6
2 .....	24.5 "	43.8 "	McLean Bros. & Rigg.	1 6
3 .....	24.3 "	43.7 "	F. H. Faulding & Co.	1 6
4 .....	24.2 "	43.5 "	E. & W. Hackett.	2 0
5 .....	24 "	43.6 "	Harris, Scarfe, & Co.	1 4
6 .....	20.2 "	34.8 "	—	1 4
7 .....	51.7 "	Nil.	—	2 0
8 .....	23.3 "	41.8 per cent.	—	1 4
9 .....	3.8 "	7.6 "	—	2 0

For obvious reasons the names of the firms selling the adulterated article cannot be published, but purchasers will readily see that if they use such stuff as samples Nos. 7 and 9 they will do no injury to the insects they wish to destroy, while Nos. 6 and 7 would not give satisfactory results without using larger quantities than of the first five samples. It is noticeable that the samples most adulterated are the most expensive. If No. 7 were used the excess of copper would be likely to seriously injure the trees. Fruitgrowers using Paris green as a preventive of damage by codlin moth caterpillars and other gnawing insects should purchase their supplies from one of the firms mentioned above; and as most of the pure samples are "Blundell's" Paris green, they would do well to ask for this firm's article.

## NOTES ON VEGETABLE-GROWING FOR OCTOBER.

BY GEORGE QUINN.

Continue to make sowings and plantings of cucumbers, trombones, marrows, squashes, pumpkins, sweet or rock, water, and pie melons, tomatoes, capsicums, egg plants, dwarf and runner beans, red and silver beet.

Lettuces, radishes, and cress should be sown at fortnightly intervals in cool, shaded positions.

It is well known to experienced gardeners that all the melon family require soils rich in humus—decaying vegetable matter, such as rotted weeds, stable manure, &c., are the best manures; but it is essential that they should be thoroughly rotted. These sorts always produce good crops on new land; therefore such plots should be used where opportunity offers.

All seeds that are sown now should be covered lightly with pulverised manure, otherwise the surface of the soil hardens so rapidly that the tender germs often fail to push through, and beans or melons will be found cracked off just below the seed leaves. With a mulch like this water may be applied as required; for it must be borne in mind with all seeds that when they have begun to absorb moisture the germ starts to unfold, the protecting covers burst, and if the soil is allowed to become dry the dry air penetrates and kills the germs.

Cabbages, lettuces, celery, and kohlrabi should be supplied with liquid manure where practicable.

The soil between rows of carrots, onions, peas, parsnips, carrots, and potatoes should be kept stirred up well and pulverised; this will not only destroy the weeds, but retain the moisture. The general practice of doing this work with a chop or common hoe does not commend itself to my mind, because the operator has to constantly tread upon the soil which has been loosened. This presses the surface down firmly and allows evaporation to go on almost as rapidly as before; and should a shower of rain follow shortly after the work is done, the weeds that have been trodden on will invariably restart. If a Dutch or push hoe be used these disadvantages are avoided, and if the instrument be set to a suitable slope to the handle the soil can be stirred deeper than with a chop hoe. On soils that are at all workable much more ground can be covered in a day with a Dutch hoe. Where these crops are grown in a large way the best and quickest method is to hand-weed the rows for a couple of inches each side, then put the one-horse Planet hoe between them.

Earlier planted melons and tomatoes require shelter, and, if not mulched already, this should be done at once. A very good plan where ground is cheap is to sow rows of maize between the rows of these plants on the side from which the prevailing or destructive winds come. This will shelter them in the earlier stages, and may afterwards be cut for feeding stock. The writer has found this an excellent breakwind for dwarf beans, &c.

As cucumbers begin to branch out pinch off the points of the first side shoots; this causes them to throw out a lot of lateral growths, and is conducive to the increased production of fruit.

In the cool hilly districts low-lying swamp lands, that have been unused during the winter, can now be brought into cultivation, and sowings made of peas, beans, carrots, parsnips, turnips, red and silver beet, cucumbers, and melons of all kinds. Plants of Cape gooseberry may be put out, or seeds sown. Most people seem quite unaware of the fine preserve that may be made from this easily-grown fruit.

Bunches of herbs should be cut before the stalks grow tough and woody and the flowers or seeds are developed. If placed in calico or paper bags and hung in a shed, tops down, they will soon be dry enough to store for future use. Cabbages and cauliflowers for seed-saving should be selected, and if they are growing in beds required for immediate cultivation they may be lifted and replanted in suitable positions. Care should be taken to prevent any inferior plants of the same family from blooming in close proximity, or a fine net may be placed over the desirable plants to keep away insects until the pods are set.

## MISCELLANEOUS ITEMS.

### PURE VINEGAR.

The name "vinegar" is a corruption of the original French *vin aigre* (sour wine). In the proper acceptance of the term "vinegar," we mean sour wine, resulting from the fermented juice of grapes or fruit of any kind, or from grain that has been infused and fermented. Such vinegars are pure and wholesome. But chemists have shown how to make liquids from various acids which resemble vinegar in taste, and, by adding coloring matter, dealers have been enabled to sell these concoctions as true vinegar, and at such a ridiculously low price that pure fruit or grain vinegar cannot be sold in competition. People often wonder why pickles, sauces, and the like are "not as nice as they used to be when we were young." The reason lies in the fact that chemical acids have been substituted for the pure wholesome vegetable acids formerly employed. In many of the American States they have enacted severe laws against the manufacture, sale, and use of these injurious so-called "vinegars," but in the Australasian Colonies the greater portion of vinegars sold are made from chemicals.

### STORING CITRUS FRUITS.

The Italians have a method of preserving citrus fruits in sand. An excavation of from 4ft. to 7ft. is made, and a board floor put in it. Upon this floor about 3in. of clean dry sand is placed. The fruit (orange or lemon) is carefully cut from the tree and wrapped in tissue paper. The fruit is then laid upon the sand in such a manner that the wraps do not touch each other. Three inches more of the sand is then spread on the oranges, and another layer put down in the same manner as the first, and so on until there are three tiers of either. If more than three tiers are laid down, the underneath oranges are crushed. Sand to the depth of 7in. or 8in. is then spread over the whole. Oranges are frequently kept for months by this process and kindred methods. All authorities agree that oranges and lemons which are intended to be preserved should be cut, not torn, from the tree. A similar method has been adopted by a grower of oranges in South Africa, and the fruit comes out of the "silo," as he calls it, in famous condition at a time when oranges are scarce and yield good prices. This is a good hint for lemon growers here, as the main crop of our lemons ripens too soon for the "lemon-squash" season.—*Town and Country Journal*.

### FORMS OF WATER IN THE SOIL.

In a recent report of the Cornell Experimental Station, U.S.A., the following interesting remarks on the subject of "water in the soil" are given:—

"Water exists in the soil in one of three forms—free, capillary, or hygroscopic water. Free water is that which flows downward by its own weight, causing wells and springs.

"Free water nearer than 18in to the surface injures plants, *because it fills the spaces between soil grains and excludes air*. Free water lower down is very valuable, because it is the supply from which capillary water is drawn.

"Capillary water is that which passes up or down between the particles of soil as oil passes up a wick. If the soil is drier below it passes down; if drier above than below, it passes up.

"Capillary water is the direct source of water for plants. The finer the grains of soil, the greater its capillary power to bring moisture from below.

"A fine soil, alike in all of its parts, will raise water by capillary action from a depth of 5ft. or 6ft. If the soil is in the same condition from bottom to top, this capillary water will be raised to the surface and lost by evaporation by the sun and atmosphere.

"But if a few inches of the top soil be kept loose, the capillary water cannot pass up through it, but will be held where the roots can use it.

"Hygroscopic water of the soil neither flows by its own weight nor by capillary force, but is held in a very thin film surrounding each grain of soil, from which it can only be driven off by a high degree of heat.

"It assists in keeping plants alive in severe droughts. Plants can live in soil containing as low as 5 per cent. of water, but are most thrifty in soils containing 20 per cent. to 25 per cent., or about 450 tons of water per acre in the first foot in depth of soil."

**IMPROVE THE FLOCK.**—Select only the best of the ewes for breeding and send the culls to the butcher. The rams should be well fed during May, June, and July to keep up their stamina. Provide a good paddock of feed for the ewes in lamb, and have shelter ready for them during the lambing season. There is no profit in keeping animals on the farm after they have become fit for market. The grass they eat after that time would do to raise another animal for sale.

**PROFIT FROM PIGS.**—There are some kinds of pigs which eat three times more feed per week than other kinds require, and make only half as much pork in the same time. The profitable pig eats little and makes a lot of pork within a short time. All pigs make more growth during the first six months of their lives than is made during any set period later on. As they get older they make less and less growth in proportion to the food consumed. Amongst the pure breeds the Poland-China and pure Berkshire breeds make the quickest growth whilst young, but a cross between the pure Berks or the Poland-China boar and a good large-framed sow will prove to be very hardy, thrifty, and quickly maturing. Very large pigs do not pay to raise. They are too fat, too large, and too coarse for the butcher. Pigs from 80lbs. to 120lbs. weight will generally give the most satisfactory results.

**MILD-CURED BACON.**—Mild-cured bacon retains most of the albumen unchanged; consequently the meat is softer and much more easily digested than that which has been hardened by salt in excess. The pigs are killed in the usual way, scalded and scraped; then passed through fierce flame, which takes off the outer thin skin and removes the "piggy" flavor; then the carcass is disembowelled, split down the back, the bone removed, allowed to cool, lightly salted, and then placed in a chamber where the temperature is maintained somewhere below freezing point. This prevents decay or putrefaction, but the salt continues to permeate the meat, and in about a month the cure is perfect. Then the bacon is placed in a smokehouse where the cool temperature is automatically maintained until the meat is sufficiently smoked. The greater proportion of the bacon now used in the London markets is prepared somewhat after the above method.

**SHARPEN THE AXE.**—There are some people who have so much wood to chop that they have no time to sharpen the axe, and as a result they get through very little work and make heavy toil of what might have been a pleasant exercise. By reading the agronomical papers, and attending a few of the farmers' meetings, many a weary worker might learn little "wrinkles" and pick up hints and information which would lighten his work and put weight into his banking account. The meetings of the Agricultural Bureau in his district are always open for him, and he may be able to give a useful hint sometimes as well as acquire valuable information.

**ENAMEL FOR WIRE NETTING, &c.**—To protect galvanized wire netting, etc., against rust treat as follows:—Provide for a mixture in the following proportions:—Four parts coal tar, two parts turps or kerosene, one part Portland cement. Remove the top from a 200gall. tank and sink it in the ground to half its depth, leaving provision for fire beneath. Fill the tank with water, place the tar, &c., in a vessel sufficiently wide to allow the netting to be drawn through the liquor, and place this in the larger tank. Bring the water in the 200gall. tank to a boil, stir well all the time, and, when the lot is well liquefied, run the netting or wire through. Hang the netting, by aid of S hooks, to a wire stretched on posts, to dry and harden the enamel.

## FARM PRODUCE REPORT.

Messrs. A. W. Sandford & Co. report—

September 30, 1897.

The first few days of September continued the favorable conditions which prevailed during previous month, but dry weather afterwards set in, and an unpleasant foretaste of summer was experienced; sequences of hot-wind days, followed by dry changes, continued for three weeks, rendering prospects for the crops less favorable, and in a few places seriously damaging the young wheat plant. The vernal monsoon brought very welcome rains about a week ago to the northern pastoral districts, but did not extend south into the agricultural areas. During the last few days, however, a pleasant change has set in, rain falling throughout most of the agricultural portions of the colony.

The excited condition of the world's wheat market caused the price of the cereal to further advance here, and, as usual, led to considerable speculation, some large parcels of Riverina wheat, as well as local lots, being taken up by buyers, but as export orders for flour have slackened off, the market during past week has been somewhat dull, though quotations remain unchanged. Official lines continue to rule relatively high, the result of so many mills being closed down for want of wheat. Feeding grains have met with steady demand, and the unfavorable dry weather experienced is inducing chaff merchants to bid what appears to be high figures in some instances, for new hay, already being offered; and though much will depend upon the weather during next three weeks, we think that values in this line will ease.

Stocks of potatoes in the Mount Gambier district are almost exhausted, but the supply of new crop from the Hills is increasing, although not yet nearly sufficient to fill demands, and importations of Victorian are being made. The price of onions continues to be controlled by one holder, and therefore remains stationary.

Wheat—Riverina and South Australian sells at 5s. 6d. per bush., delivered at mills.

Flour, from £13 to £13 10s.

Bran, 1s. 2d.; pollard, 1s. 2½d.

Chaff, according to quality, from £6 5s. to £6 15s. per 2,240lbs., bags in, dumped, f.o.b. Port Adelaide.

Oats, from 2s. 11d. to 3s. 1d. for local, whilst stout feed New Zealand are worth 3s. 3d. to 3s. 5d.

Potatoes—Gambiers, £4 10s. to £4 12s. 6d., at city railway station; Ballarats and Lancefields, duty paid, on wharf, Port Adelaide, £4 12s. 6d. to £4 17s. 6d.

Onions, £10 10s. to £11 at Mount Gambier.

## DAIRY PRODUCE.

In all lines under this heading demand has been very active during the month, and although there is now being produced a slight surplus of butter over requirements, the quantity is insufficient yet to offer for European shipment. During next few weeks, however, exportation will be started, and should favorable weather conditions continue over the next month or two, the estimated surplus may be realised, but the heavy losses in cattle sustained during the drought renders this somewhat problematical. Meanwhile

price of butter has apparently touched bottom, and is now inducing intercolonial purchases. Eggs continue to rule at high prices compared with market rates in the eastern colonies, but values here are now easing, though this port is having increasing preference with West Australian buyers as the weather becomes hotter. Bacon, as we anticipated, further improved in price, and a considerable portion of the raw material is being brought from Victoria and New South Wales. A slight easing at the moment is apparent, but this line also must rule high during the next few months. Cheese has been selling at rates very satisfactory to makers, and, stocks of local being almost exhausted, importations are arriving from New Zealand, but within a few weeks new season's local will commence to reach market. Almonds have experienced better sale. Good demand for honey. Poultry throughout the month realised extreme rates, and is still in strong demand. Carcass pork and veal have also been selling well, but are now slackening off a little with the setting in of warm weather. To-day following rates are being realised:—

Factory and creamery fresh butter in prints from 9d. to 9½d.; farmers' separator and dairy boxes 8d. to 9d.; good store lines 7d. to 7½d. Hen eggs, 9½d.; duck, 9½d. Local cheese from 8½d. to 9d. for best, medium to fair quality 6d. to 7½d.; prime New Zealand, duty paid, 9½d. to 10½d. for large to loaf in cases. Factory cured sides of bacon, 9½d. to 9½d.; farm fitches 8½d. to 9½d. for well cut and cured. Clear extracted honey 2½d. to 3d.; beeswax, 11½d. Soft-shell almonds, 3d. to 3½d.; kernels, 6d. Prime shop porkers, 6d. to 6½d.; medium sorts and good baconers, 5½d. to 6½d. Vealers, 2d. to 3d. per lb. Coops of hens from fair to prime sell at 1s. 10d. to 2s. 2d. each; roosters, 2s. 3d. to 2s. 8d.; ducks, 2s. 1d. to 2s. 10d.; geese, 3s. 3d. to 4s. 6d.; pigeons, 6d. to 7d.; medium condition turkeys, 5½d. to 6½d. per lb. live weight; good table birds selling at up to 8½d.

## CROP AND WEATHER REPORT.

**ARTHURTON.**—Since previous report we have had a lot of wind and several hot days and little rain. This has told on the crops, and unless good rains come very soon the unmanured crops will yield but little better than last year. Feed is plentiful in most places, and stock are doing well. Rainfall, 1.509; for year to September 18, 10.229in.

**BAROOTA WHIM.**—Crops and grass on the clay soils look healthy but short, while on the light porous soils they are very poor. Fallowing has been a matter of difficulty, on account of the scarcity of feed for stock, the grass being now no better than it is in July in ordinary seasons. On the 15th and 16th September the thermometer registered 90° to 95° in the shade, doing much injury to the crops. Unless a good fall of rain occurs shortly the hay and wheat crops will be very light.

**BOHMERSTOWN.**—The weather has been mild and favorable, and in most parts of the district the crops are looking well. Feed of all descriptions is growing fast and stock are improving rapidly. Shearing will soon commence, and a serious shortness in wool and lambs is certain. Two splendid draught and one blood entire have been introduced into the district, with a view to the improvement of the horse stock.

**BOWHILL.**—Crops are growing splendidly, and the prospects are very favorable. The warm weather is causing the plant to head rather quicker than was expected, and unless we soon have rain and cooler weather haymaking will be started early this season.

**CALCA.**—The weather of late has been very boisterous, causing much injury to crops on sandy soil. The crops are very backward, and haymaking will start later than usual. The grass has made good growth lately, and stock are improving. Shearing has commenced here; the clip appears good, considering the season.

**CHERRY GARDENS.**—The weather has been most favorable to the growth of the crops, though in unprotected places the strong winds have done some damage.

**CRYSTAL BROOK.**—Rainfall for August, 1.895in. The weather since has been rather dry, and not too favorable to the crops, which in some parts are suffering from want of moisture. Stock are in good condition, but unless we get good rain soon there will soon be but little feed.

**DAWSON.**—Owing to the continued dry weather the prospects for the wheat crop are not satisfactory, and unless we soon get a good soaking rain there will be very little to harvest. Pasture is in a better condition than the crops, and stock of all descriptions are improving in condition.

**GAWLER RIVER.**—The weather has set in rather dry, with strong northerly winds, which has had a very drying effect. The crops look well and are growing strongly, some already coming into ear; but a good fall of rain is badly needed. Feed is growing well, and stock improving in condition. Apricots and peaches are flowering well. Rainfall for August, 2.920in.; for September, to 18th, 0.930in.

**GLADSTONE.**—The crops and feed are growing very fast and look well, but complaints are being heard of want of rain on the east side of the Flinders Range. We have had three or four hot windy days, and a good fall of rain would be acceptable.

**KADINA.**—Since last report we have been favored with light rains, and crops and grass have made good growth. Soaking rain is badly wanted, as the past few days have been very trying, and the grass and herbage are rapidly running to seed. Stock are improving, but still in low condition.

**LUCINDALE.**—Since last report we have had very variable weather, ending this week with hot winds and then thunderstorm with rain. On the whole a very good month for all crops, which never looked better. Stock are also fast improving, and the lambing percentage was slightly better than expected. In the orchards fruit is setting well, and a good harvest may be expected. Some orchardists have still trouble with the peach aphid, despite sprayings and root dressings. Rainfall for month, 3·000in.

**LYNDROCH.**—The weather has been very favorable during past month, and the crops look well, though the "dandelion" weed is very plentiful. There is every prospect of a good season. The loss of stock has been small. Feed is growing well, and stock are picking up fast. Frosts have been very prevalent, but not severe. Lambing is fairly good, and sheep are generally doing well.

**MAITLAND.**—The last few days have been very hot, and have caused some of the crops to run up too fast. More rain is much wanted. The manured crops are looking well, but the others are very backward. Stock are picking up, though feed is very short. Rainfall since previous report, about 2·000in.

**MELROSE.**—We have had a very warm week, with strong, drying winds. Crops look healthy, but more rain is required to prevent them from running to seed. Frosts have not been so severe as usual. Rainfall for August, 2·940in.; September, to 18th, 0·970in.

**MINLACOWIE** (Hundred of.)—Since previous report prospects have, on the whole, brightened. Stock are rapidly improving, but the wool clip is not likely to be up to the mark in quality. Splendid rains, with nice sunny weather, have been experienced, and the crops are generally growing well, especially those which were cultivated after the rains. Hot winds on two days did no good to the crops.

**MOUNT BRYAN EAST.**—Many of the wheat crops are very backward, while wild oats are thick. It is generally considered that a fair average crop will be reaped, though it is getting rather late for a heavy return. Much more rain is required to bring on the crops and grass, and unless a good fall occurs soon there will be little hay cut.

**MOUNT COMPASS.**—Since previous report we have had heavy rains and warm weather. The crops are looking well, and the fruit trees healthy. Many cows are suffering from a complaint causing blindness during the day time.

**MOUNT PLEASANT.**—Crop prospects continue good, and stock are fast improving in condition.

**PENOLA.** Very rough weather was experienced at the end of August, with the much needed rains. The fall was very good, and vegetation has improved in consequence. The fruit trees are looking well, and there is a good setting of apricots. Frosts have not been severe.

**PINE FOREST.**—Good rains fell at the end of August, but since then it has been hot and dry. The crops and grass have made good growth, and the early wheat and oats are coming into ear. Stock are improving in condition. Rainfall for September, to 16th, 0·610in.

**PORT BROUGHTON.**—The weather at the beginning of the month was all that could be desired, but lately we have had hot winds, which have injured the crops and grass, and unless rain comes soon the outlook will be far from promising. Stock are looking well.

**PORT ELLIOT.**—Rainfall for August, 5·500in., the record for this month. This gave the ground a thorough soaking, and the springs are running well; 1·218in. have fallen since end of August, but three or four hot days have made a marked difference in the appearance of the country.

**QUORN.**—The prospects of the season are anything but promising. In July 3·500in. of rain fell, giving the crops and grass a splendid start; August was rather dry, 1·660in. only falling, but since first week in September the dry hot weather has caused the crops to wither in patches. Unless good rains come very soon there will be very little crop. The crops drilled in with manure look better than those broadcasted. Stock are now in good condition.

**RICHMAN'S CREEK.**—The feed has come on wonderfully during past month, but there is not much standing grass in it. Stock are picking up well. The wheat has stood out well, but the recent dry weather has checked it, and a good fall of rain is badly wanted.

**SADDLEWORTH.**—The crops are making good progress, under the influence of very favorable growing weather. The weeds, especially dandelion, are competing in some places only too successfully with the wheat plant. Stock generally are improving in condition. Orders are already being given for artificial fertilisers for next year, as a result of the improved appearance of the crops so manured this season. Rainfall for August, 3·840in., was nearly 1½in. over the average. For the 8 months, 11·290; for September, to 22nd, 0·930in.

## CENTRAL AGRICULTURAL BUREAU.

MONDAY, SEPTEMBER 6.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir S. Davenport, Hon. A. W. Sandford, Professor W. Lowrie, Messrs Samuel Goode, W. C. Grasby, H. Kelly, J. Miller, T. Price, T. B. Robson, W. F. Snow, and A. Molineux (Secretary).

### Codlin Moth Regulations.

The Minister referred the Codlin Moth Regulations and request of deputation of fruitgrowers for relaxation of same back to the Bureau for further report. After considerable discussion it was resolved to invite expert fruitgrowers to meet the members of the Central Bureau to consider the matter.

### Disinfection of Fruit Cases.

The Minister asked for report from the Bureau on request of deputation from Angaston and Tanunda districts that the Vine, Fruit, and Vegetable Protection Act should be amended to provide for the establishment of fruit boards to administer the Act: that some scheme for the disinfection of all return fruit cases should be adopted, and that it should be compulsory for owners of orchards infected by the codlin moth to report the same to the department. The Minister intimated that he considered the disinfection of the cases almost a necessity, and although it might be difficult to enforce the same he would be glad of suggestions from the Bureau in the matter.

Mr. SANDFORD said he thought the question of doing away with returns and only using new cases deserved the serious consideration of the fruitgrowers. They would find that in the end it would cost them very little more than the present system with all its annoyances. New cases, in the flat, could probably be obtained for 6d. or 7d. each, and might be sold with the fruit. Kerosene cases as now used were not obtainable at less than 7s. 6d. per dozen if in good condition. They had much the same trouble in the dairy industry at one time, but the "trade" decided that only new boxes should be accepted, and they found this worked satisfactorily.

After some discussion it was decided to remit the matter to a committee of Messrs. A. W. Sandford, A. Molineux, and G. Quinn, to report to the Bureau.

### Fertilisers.

The Minister forwarded reply of the Government Geologist (Mr. H. Y. L. Brown) to request of the Bureau that he should report on the probability of deposits of phosphatic or potassic fertilisers being discovered beneath the salt pans and lakes on Yorke's Peninsula. Mr. Brown stated that it was very doubtful whether such deposits existed in the localities mentioned, and the absence of any indications on the surface or in any bores or wells which have been sunk is against the probability of such being found.

Considerable discussion ensued, and reference was made to the discovery in several localities of low-grade phosphatic rocks and the very great benefits which would result if rocks containing a higher percentage of phosphoric acid could be discovered.

PROFESSOR LOWRIE said the presence of deposits of salt was not an indication that potash or phosphates existed below, and he did not consider the prospects were good enough to warrant their recommending much expendi-



ture in testing the matter. There were a number of private prospectors searching for such deposits, and a report from the Government Geologist on the most likely districts for finding such would be of considerable help. He would therefore move—"That the Minister be asked to obtain from the Government Geologist a report on the probability of phosphoric and potassic deposits being found in South Australia, and (if any) the localities most favorable to their discovery." (Carried.)

### Dairying.

Mr. PRICE referred to the very great improvement in the yield of cows belonging to the Co-operative Dairy, which had been effected by continued selection and breeding from the best cows. In the herd of 100 cows the average yield per cow was now 471galls. per annum, an increase over the previous year's average of 21galls. per cow.

### Homeria.

Mr. MILLER tabled specimen of supposed poisonous weed from Yankalilla.

The SECRETARY said it was *Homeria* (synonym, *Bobartia*) *aurantiaca*. This is poisonous, and the Bureau had recommended that it should be placed on the list of noxious weeds, but this had not been done.

The CHAIRMAN and Mr. GOODE stated that this plant was growing in their gardens and was most difficult to eradicate.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

149. *Less Moisture Required with Raw Potash Salts.*—Mr. M. Maercker, of Halle, lately wrote a paper on the subject of "Raw Potash Salts," meaning kainit and karnallit, stating that they prevent evaporation from the soil and thus save watering plants. In his experiments he used a sandy soil, which contained  $2\frac{1}{2}$  per cent. of a mull of peat, and he sowed mustard on it. The soil contained, in five vessels, 18 per cent. of water, and in other five vessels 8 per cent. of water. Two of them received common salt at the rate of 4,000lbs. per hectare ( $2\frac{1}{2}$  acres), which interfered much with the crop produced, being respectively one-third and nearly one-fourth less than from the other vessels. (Of course the consumption of water was considerably less. The proportion of water consumption of the other vessels was—without potash salts, 100; with, at the rate of 2,000lbs. of kainit per acre and 18 per cent. of water, 90.5, and with 8 per cent. of water, 77.1; with, at the rate of 4,000lbs. of kainit per hectare and 18 per cent. of water, 88.4; with, at the rate of 4,000lbs. of karnallit and 18 per cent. of water, 91.9, and with 8 per cent. of water, 68.9. Of dry substance 12.60galls. were harvested without potash, requiring 3,447 galls. of water, against 12.10galls. of dry substance, which was obtained by using at the rate of 2,000lbs. of kainit per hectare with 2,736galls. of water, and against 12.20galls. of dry substance, by using at the rate of 4,000lbs. of karnallit per hectare, requiring only 2,445galls. of water. In a dry season this will be important. In the one case 711galls. and in the other 1,002galls. less water was required for producing very nearly the same quantity of dry substance. By the above experiments no increase in the produce could take place, but in experiments to be made this year the same quantity of water will be given to all vessels, with and without potash salts, and thus enable the former to give an increased produce: 4cwts. of kainit per acre in a very dry soil should save 22.9 per cent. of water, but usually only 2cwts. are used per acre. It is very probable that the saving of water will be lasting for at least more than one crop.

150. *Feeding with Peas and Gram.*—Professor Dr. Emil Pott reports that pigs digest whole raw peas remarkably well. Of 2cwts. of peas Mr. J. Lohmann found only 8lbs. undigested in the excrements, while in a like quantity of rye nearly 100lbs.; of oats over 101lbs., and of barley over 109lbs. were undigested. Mr. Erh got the best results with crushed grains, next with the uncrushed grains. Boiled grains proved to be most unsatisfactory; and as regards peas, boiling is by no means better, in fact not advisable unless

they are damp or mouldy. Riethusen and Bahr found that when feeding cows with crushed and afterwards with boiled vetches and oats both the milk and the weight of the animals increased more with the crushed.

151. *The Life of Phylloxera*.—Our vinegrowers should be aware of the life-history of phylloxera, and I extract and translate, therefore, part of an article from the new edition of Meyer's "Conversations Lexicon." There are two forms of the insect. The root-louse is from 0·3mm. to 1·5mm. long, according to its age. Shortly after appearance from the egg it is of a bright, light-yellow color, oblong ovate, pointed towards the hind part. The legs are proportionately strong and large, the feelers three-membered, and the sucking bristles within a sheath, with which they pierce the rootlets, and in sucking them the body of the insect becomes larger and somewhat pear-shaped. After casting the skin several times they are full grown, and of a brownish-yellow or greenish color. At this time it lays thirty to fifty light-yellow eggs, about 0·32mm. long and 0·16mm. broad, which become gradually brown, and they bring forth females, which are partheno-genetic [which means propagating by a virgin without impregnation]. In the course of a year follow from six to eight generations. The lice form at first on the juicy points of the rootlets oblong nodosities, which are frequently knee-shaped, and later on these appear on other parts of the rootlets and even on the stronger and strongest roots, so that these look rugged. All infected roots die gradually from rottenness, the vine becomes sickly, from year to year the growth of the shoots and the leaves is more weakly, no grapes are formed, and when in three or more years the vines succumb the lice leave them. They travel below the ground and the winged form above it, but they are also distributed by other animals, floods, tools, boots, and by means of cuttings or rooted vines. In summer appears the second form of phylloxera, with pocket-shaped sheaths for the wings, with longer legs and a lengthened last member of the feelers. This form becomes winged after having cast the skin several times, and the wings are comparatively large, while the body is 0·65mm. to 1·52mm. long. The insects lay from one to seven partheno-genetic eggs, mostly from two to four, upon the lower side of vine leaves, and die. From the smaller of these brownish eggs, 0·26mm. long by 0·13mm. broad, escape males; from the larger, 0·4mm. long and 0·2mm. broad, which are more cylindrical and of a light-yellow colour, females. These insects with genitals are 0·3mm. to 0·45mm. long and without wings, and without organs for taking food. The female, after copulation, lays one-holed egg, which is at first yellowish, afterwards olive-green, under the loose bark of older of the vine. They winter (the winter egg), and produce in spring a louse similar to those on the roots, and makes its way to them. On some American vines you may find still another form, *Phylloxera vastratrix*, var. *gallicola*, which produces galls in the form of warts, on the lower sides of the leaves. These are very seldom found on *Vitis vinifera* varieties, which are hitherto mainly used for wine-making. Elsewhere I found it stated that successive broods of phylloxera could live on remnants of vine roots for six years and more; but inundation, as frequently used in France, to a depth of a few inches for about a month suffocates the insect. Bisulphide of carbon, petroleum, phenyle, and sulpho-carbonate of potassium are also effective. In Germany the vines are not uprooted. The trunk is cut out and burned with the stakes, and after the lower end of the trunk is soaked with petroleum the soil is levelled in, and every 3ft. holes are made by an iron bar, 3ft. deep. Into these, per square metre, 300galls. to 400galls. of bisulphide of carbon are poured, and the holes closed up. Last of all, the whole ground is watered with petroleum. Up to the end of 1894 the German Government had spent £261,687 in the war with the phylloxera. It is generally admitted that vines planted in very sandy soil are fairly protected from the phylloxera.

152. *Paper on New Varieties of Grain and Assistance to Orchardists*.—The Imperial Academy of Sciences at Berlin offers a prize of M2,000 (nearly £100) for the best treatise on the origin and subsequent development of new varieties of cereals, during the last twenty years, based upon the writer's own experience and observation; may be in the German, Latin, English, French, or Italian language; to be delivered before the 31st day of December, 1898. The Minister of Agriculture for Prussia proposes to assist the Crown tenants who are willing to plant larger orchards, by paying for the trees and to allow in the rent for the area so planted and the cost of cultivation, so long as the trees are not bearing sufficiently to cover the cost.

### Branch at Inkerman.

The establishment of a Branch at Inkerman was approved, the following gentlemen being appointed as members:—Messrs. S. Diprose, D. J. Strongman, J. Sampson, W. Board, Thomas Forrest, D. Fraser, W. A. Hewett, S. Wills, C. H. Daniels, W. Fraser, R. Kennedy, and E. M. Hewett.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Naracoorte, Messrs. Joseph Langberg and J. D. Smith; Redhill, Mr. A. Hill; Mount Remarkable, Mr. T. P. Yates; Narridy, Mr. James Nicolson; Tatiara, Mr. Joseph Green; Swan Reach, Messrs. B. Schwartz, F. F. Brecht, and August Hohnberg; Murray Bridge, Mr. W. F. Wundersitz.

### Reports by Branches.

The SECRETARY reported receipt since previous meeting of fifty-four reports of Branch meetings.

MONDAY, SEPTEMBER 20.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir Samuel Davenport, Messrs. Samuel Goode, W. C. Grasby, M. Holtze, T. Price, T. B. Robson, W. F. Snow, A. Molineux (Secretary), and G. Quinn (Inspector of Fruit).

### Finance.

The Finance Committee reported expenditure to date, for contingencies, £60 2s.; accounts to the amount of £11 9s. 9d. were passed for payment.

### Codlin Moth Regulations.

The SECRETARY read the following report, submitted by the Inspector of Fruit:—

I have the honor to submit a transcript of the evidence given before your board by fruitgrowers on September 10th, 1897, respecting their treatment for codlin moth. The growers examined were Messrs. G. R. Laffer, of Belair, Wm. Merchant, Norton's Summit; A. B. Robin, Nuriootpa; W. Sage, Angaston; F. H. Sonnemann, Hahndorf; C. Pitt, Felixstow. As the inquiry seemed to be upon the effectiveness and practicability of the different sections of the regulations, I have divided the evidence under the various headings, and submit a digest of same.

*Spraying with Paris Green.*—Messrs. Laffer and Sonnemann had each sprayed once. Messrs. Robin and Sage had not yet required to spray, being in clean districts. Mr. Merchant had sprayed twice, and Mr. Pitt had sprayed four times. None of the witnesses had any idea of the quality of the Paris green used, excepting Mr. Pitt, who had given two later sprayings with Paris green which the Inspector had recommended.

*Cleaning the Trunks and Limbs of the Trees.*—Messrs. Laffer, Merchant, Sonnemann, Robin, and Sage believed in doing this work thoroughly. Mr. Pitt objected to the scraping on account of the cost and injury done to the trees.

*Bandaging the Stems of the Trees.*—All the witnesses considered this method very useful.

*Gathering Infested Fruits from Trees Weekly.*—All the witnesses consider the strict observance of this impracticable, though attention is desirable.

*Gathering Fallen Infested Fruits Daily.*—All the witnesses considered this too costly in large orchards, if strictly enforced. Mr. Robin said where bandages and general cleanliness is observed once a week would be sufficient.

*Cleanly Cultivation.*—Messrs. Pitt and Laffer disbelieved in cultivating the surface of the soil, as the larvae sheltered in the clods. Messrs. Merchant, Sonnemann, Robin, and Sage believed in cleanly cultivation.

*Prohibiting the Sales of Infested Fruits.*—Messrs. Laffer, Merchant, Sonnemann, Robin, and Sage supported this regulation. Mr. Pitt objected on the grounds that as every infested fruit was not detectable, he saw no use in prohibiting the sales of any inside the infested districts.

*Other Opinions Expressed.*—All the witnesses agreed that to do any good in the direction of enforcing the provisions of the regulations, more paid inspectors were necessary, and that members of Bureaus, police officers, and district constables were unsuited to the work in an honorary capacity. Compulsory attention to orchards for the codlin moth was considered necessary by Messrs. Laffer, Merchant, Sonnemann, Robin, and Sage. Mr. Pitt had no opinion to give on the matter, excepting that amateur fruitgrowers required looking after. Disinfecting fruit cases was considered desirable by all witnesses, but no definite general method or scheme was suggested. The use of new cases each time was not

considered practicable by any of the witnesses. Messrs. Merchant, Robin, and Sage expressed the opinion that both growers and dealers should be responsible for the condition of the cases found in their possession. The codlin moth larvæ did not in the opinion of any witness voluntarily attack potatoes or tomatoes and rarely stone fruits, and the larvæ found in these were believed to be incapable of reproduction. Restriction and reduction of the pest was considered necessary and practicable by all the witnesses, but its extermination Mr. Pitt considered only possible by starvation, such as gathering the whole fruit crop and destroying it at once for two consecutive seasons.

It will thus be seen that although the costs attached to some of the other provisions are very much questioned, it is only in the case of the spraying that the efficacy of the regulations is severely questioned, and from the evidence taken it may be truthfully inferred that no reliable evidence is obtainable on this matter, as the witnesses had no idea of the constituents of the material used, and had not persisted to any extent in its use. As it is the intention of the Government to thoroughly test these regulations, and more particularly the spraying with Paris green, in a practical manner in an orchard which I have secured, during the coming season, I would respectfully suggest to your board the advisableness of permitting the spraying clause to remain in abeyance during this season; but as we have many intelligent growers supporting the section which prohibits the sale of the infested fruit, I respectfully ask your co-operation in securing the necessary inspectors to enforce this portion of the regulations thoroughly, as well as devising some method of securing the disinfection of fruit cases and bags. If these portions can be enforced the spread of the pest will in the meantime be restricted considerably, and should the spraying tests prove satisfactory, growers may reasonably be asked to utilise this means in the future.

The report was adopted, and a vote of thanks accorded to Mr. Quinn for preparing same. It was decided to recommend the Hon. Minister of Agriculture and Education to adopt his recommendations as to allowing spraying with Paris green to remain in abeyance, and enforce the restrictions against the sale of infected fruit. It was also decided to give him the support of the Bureau in the experiments to be carried out by him this season in dealing with the pest. It was decided to appoint a sub-committee to watch these experiments, and to verify the results. Messrs. W. C. Grasby, Thos. Hardy, T. Price, and T. B. Robson were appointed to represent the Central Bureau, and Messrs. J. Western, A. Quick, E. W. Howard, and R. Kelly, as residents of the district, will be asked to act upon the committee, with power to add to their number.

Mr. HOLTZE said he did not think they would ever effectually get rid of the pest unless they starved it out in the infected districts. This could only be done by destroying all the fruit for two years, and paying the growers compensation. It would pay the growers in clean districts to agree to this, as the better price obtainable in consequence for their fruit would more than repay any levy made on them to provide compensation. He considered spraying while the trees were in full blossom the cheapest and quickest way of destroying the fruit. Some discussion ensued, many members being of opinion that this was the only way of getting rid of the pest, and thought the money for payment of compensation could be levied from the growers by a tax per acre on the orchards. It was pointed out that if some workable scheme could be adopted, it would allow of the tall-growing trees being headed back, so as to make them more easily treated in future. Finally, Mr. Holtze gave notice that at the first meeting in December he would move that this matter be brought under the notice of the Government, with a view to the adoption of some workable scheme of compensation. In the mean time it was decided to ask the fruitgrowers to submit any suggestions they may desire on the subject.

### **Minlaton Conference.**

The Hon. Secretary, Minlaton Branch, wrote that the proposed conference of Yorke's Peninsula Branches had been postponed till October.

### **Donations and Exchanges.**

The SECRETARY announced the usual exchanges from agricultural departments, and seeds from Cherry Gardens and Mount Pleasant Branches.

### Dairy Cows and Milk Yields.

The CHAIRMAN said that Professor Lowrie remarked at the Congress that the Holstein cows gave the most, but also the poorest, milk in regard to butter fat. This may have been the fact years ago, but lately they have as rich milk at least from the much improved herds in the United States. So did Pauline Paul, weighing 1,450lbs., give 1,153½lbs. of butter in a year, against a Jersey cow, Bisson's Belle, who weighed 1,050lbs., giving 1,028½lbs. This proves that the Holsteins are not "milk and water cows." Another Holstein cow, Mercedes, gave 99lbs 6½oz., Mechthilde, 150lbs. 8oz., in a month: Lady Baker, in seven days, 31lbs. 6oz.; Se Kol II., 33lbs. 6oz.; Bettina, 32lbs. 1½oz.; Gaben III., 32lbs.; Parthenia, 38½lbs. For 1lb. of butter from 12½lbs. to 13lbs. of milk was used, and Mechthilde gave on some days from 113lbs to 122lbs. 8oz. of milk, and in a year, from individuals of one herd, from 24,126lbs. to 30,318lbs. 8oz. of milk was taken, and ever so many cows gave 10,500lbs. Of Jersey cows, Little Goldie gave in seven days 34½lbs., and Lily Flag in a year 1,047lbs. One advantage of the Holsteins also, where they can get rich feed, is their large frame and easy fattening.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

154. *Potatoes on Light Soil*.—Mr. Vibrans, in a paper on the results of manuring on light soils, says that stable dung makes them too loose, and commercial manures were on that account preferable. For ten years from 1869 he had used stable dung, and was unable to get a better crop of potatoes than 50cwt. per morgen (somewhat more than half an acre.) During the next ten years he used only green manuring, and had up to 96cwt. per morgen; but on using stable dung with green and mineral manures, he was enabled to raise still better crops. Mr. F. Schirmer, of the Experimental Station at Neuhaus, harvested on Iar. (4 roods) of sixth-class soil, after the common vetch, 418lbs. of potatoes of 19.4 per cent. of starch, and an increase of 10½ tubers; after mixed lupins, 191lbs. of 20.5 per cent. of starch, and 9½ increase; after mixed mustard, rape, and buckwheat, 185lbs. of 20.5 per cent. of starch, and 9½ increase. Several other leguminous plants ploughed in gave a somewhat smaller increase, while unmanured soil gave only 142lbs. of potatoes of 19.4 per cent. of starch, and 7½ increase of tubers. Nearly all kinds contained a greater or lesser number of diseased potatoes, viz., from 1 to 15 per cent. Amongst thirty-two sorts he found "Reichskanzler" and "Professor Maercker" to contain most starch, and their very good crops showed not a single diseased potato.

155. *Decrease of Crop of Old Varieties of Wheat*.—Mr. O. Cimbals, well known as a person who has produced many new varieties of potatoes, is also growing a large number of varieties of wheat, and has obtained, as the result of his crosses, several hundred new varieties. He ascribes the poorer and poorer crops from old varieties to the increasing number of barren earlets, which frequently are 15 per cent. and more, while you cannot find more than 2 per cent. or 3 per cent. in wheat raised more lately. The pistils, or female parts of the ears become sterile at an earlier date than the anthers, or male parts, exactly as with animals; only that in the plant it is not the individual, it is the variety as a whole which suffers from age. Wheat hardly ever produces crosses without artificial help, as the bracts do not open at the time of flowering, as is the case with most flowers. Mr. Vilmorin says, "With wheat, the wedding takes place with closed doors." Selections of the best ears and grains may be hindering the deterioration or decrease of produce to some extent, but crossing is the only way to obtain vigorous growth and a large crop.

156. *The Physical and Mechanical State of the Soil when Manuring*.—Professor Dr. E. Woolny, of Munich, has an article on the mania of manuring in Germany, in which he asserts that seemingly not sufficient notice of the physical state of the soil is taken, and he calls attention to the absolute necessity of not overlooking this if the best results are to be expected. The finer the particles of the soil the better it is able to absorb large quantities of water, which, if superabundant, may destroy the influence of the manure. But, again, if the particles of the soil are too coarse they may not hold sufficient water—or get it by capillary movement from ground water, which rises only in the very best soils to barely 4ft. in sand to 18in.—to obtain any satisfactory return from the manures. He made a number of experiments in perforated vessels, 1ft. by 1ft. and 4in. deep, sunk into the ground, wherein the particles of soil were of six different kinds of fineness, and from

these it appeared that his statement was perfectly correct as regards the finer or coarser particles of the soil and the quantity of produce obtained. From the two vessels wherein the particles were only of the size of 0.25mm., he harvested from that which was without manure 2.18g. of rye; from the manured vessel 10.95g. The next four experiments with gradually coarser particles of soil showed a proportionate decline in the crop in both the manured and unmanured vessels; and with the sixth, two vessels containing the coarsest particles of soil, viz., between 4mm. and 6.75mm., the unmanured vessel ripened actually only 0.24g. of rye, and the manured vessel 1.22g. of rye. The first experiment was, however, by no means made with the finest particles of soil which he might have used. Other experiments were made by the professor to show that deeper cultivation up to 1ft. 4in. was of the greatest importance to enable the soil to store sufficient water, and to give the manure a better chance against unmanured soil. Where the ploughing was 4in. deep, manured rye gave only 13g. more grain than unmanured; at 8in. deep 38g. more, at 1ft. deep 108g. more, and at 16ins. deep 146g. more. Similar results he had with rape. His experiments as regards situation are nearly useless to us. Here we may expect that ground sloping more or less towards the north will require proportionately a larger supply of water, and in dry seasons it may make a great difference in the harvest, also the benefit from manure nearly nil. He next speaks of the mechanical action of making the soil loose, which permits the spread of the roots and the penetration of air and water. Where the soil was not worked but manured, for drilled rape he received 296g., and without manure 141g.; where it was worked 3½in. deep with manure 400g., and without it 165g.; where worked 14in. deep with manure 570g., and without it 294g. The manure had therefore far more influence where the soil was worked, and its influence increased with the depth; so that the mechanical state of the soil was all-important. The strong and clayey soils, however, should not be worked to a powder, or they will in very heavy rains hold too much water, become hard with the dry weather, and prevent the penetration of the air. The soil should remain in a crumbling state, which will allow the rain to sink through the interstices, and these will also prevent the drying up by their interruption of the capillary attraction, and give free access to the air. Lastly, he refers to the quantity of seed, and reminds us of the large transpiration of water by means of the parts of all plants above ground. If they are sown too thick they may require too much water, and the effect of the manure will be more or less annulled. It is advisable to use less seed on manured than on unmanured soil if you wish to obtain the full benefit from the manure. He showed this also by potatoes planted at greater and smaller distances. If as many as forty-nine plants are on four square metres, the crop was scarcely larger with manure than without it. Of course, if weeds take possession of the land they will do the same as too thick sowing or planting does, i.e., reduce the water supply and interfere with the full use of the manure.

**157. Milk Rich in Butter Fat.**—Professor Dr. Soxhlet, of Munich, made experiments with fodders, oils, and oilcakes, and came to the same conclusions as the well-known dairyman, Aug. Dettweiler. Feeding with fodder containing much starch, as potatoes, wheat, maize, and other grains, did not increase the butter fat. The cows only increased in weight and got fatter. When feeding more hay and proteine, that is, albuminous substances like juicy plants, peas, beans, the cows will also give more but not fatter milk. Mixing 1½lbs. to 2lbs. of linseed oil, sesame oil, or stearine as an emulsion in the water, and feeding from 18lbs. to 22lbs. of hay, he got milk fat up to 5.8 per cent. To mix the oil with the food, or to feed whole linseed, does not make the oil so digestible, and has not the desired result. Soxhlet is certain that in feeding with oils the fat does not go direct into the milk. It is fat from the cow itself which gets into it, as the butter becomes harder instead of oilier or softer. Many cows can be fed thoroughly well, but the butter fat in the milk remains much behind that of other cows of the same race. Professor Dr. Lehmann obtained from 1cwt. of copra 20lbs. more butter than without it, but from 1cwt. of copra meal only 3½lbs. more.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Arthurton, Mr. Job Pearson; Stockport, Messrs. S. Nairn and W. Barker; Port Lincoln, Messrs. W. Laidlaw and W. E. Goode; Swan Reach, Mr. G. N. Lemke; Robertstown, Mr. W. Mosey; Murray Bridge, Mr. J. G. Newmann.

### Reports by Branches.

The SECRETARY reported receipt, since previous meeting, of twenty reports of Branch meetings.

## REPORTS BY BRANCHES.

## Carrieton, August 26.

Present—Messrs. W. J. Gleeson (Chairman), W. H. Byerlee, M. Manning, A. Steinke, W. Steinke, N. Travers, J. McNamara, G. Martin, and J. W. Bock (Hon. Sec.).

TREE-PLANTING.—Matters in connection with the planting of forest trees and the establishment of a forest reserve in the district were dealt with.

OFFICERS.—Messrs. W. J. Gleeson, W. H. Byerlee, and J. W. Bock were re-elected Chairman, Vice-chairman, and Hon. Sec. respectively.

## Strathalbyn, August 16.

Present—Messrs. M. Rankine (Chairman), B. Smith, Hon. J. L. Stirling, W. J. Tucker, G. Sissons, A. Rankine, W. M. Rankine, R. Watt, H. H. Butler, J. Cheriton (Hon. Sec.), and two visitors.

FRUIT PEST.—Mr. W. M. Rankine tabled two branches of almond blossoms infested by a small insect which eats the embryo of the fruit. To be referred to Central Bureau. [A number of the buds had been attacked by some insect, which, however, was not to be found in the specimens sent. A large number of blossoms had from some reason failed to mature.—GEN. SEC.]

WEEDS.—Mr. Rankine tabled plants of *Datura stramonium*, a nasty weed which should be carefully watched for and destroyed. Mr. Smith called attention to the spread of the so-called wild onion (*Asphodelus fistulosus*), which nothing appeared to touch. [Illustrations of these two weeds were published in the August issue of the *Journal of Agriculture and Industry*.—GEN. SEC.]

FEED FOR STOCK.—The Hon. J. L. Stirling stated that he used molasses with straw for cattle. They were very fond of this and did well on it. He had also used a new cattle food, composed of bran and molasses, and found the cattle very fond of it. Several members had used copra cake with satisfactory results, but the price was practically prohibitive.

DRILLING CEREAL CROPS.—A long discussion took place on the question of use of the seed and manure drill. Four of the members have had small areas drilled in with different manures as an experiment. Members generally considered this was the best method of putting in the crop, and, with improvements in the machines, would become universal.

GRAZING AND FERTILITY OF THE SOIL.—Mr. W. M. Rankine, in opening a discussion on the effects of continued grazing on the fertility of the soil, stated that he had sown wheat on land grazed with sheep for fifteen years and got a poorer crop than from land that had been cropped continuously. Mr. A. Rankine said that in a paddock where five or six years ago he could keep 500 sheep well during the past year or two he could not keep 350 in good condition. There was a weed which grew flat on the surface, destroying other vegetation. Members were of opinion that the dry seasons had been partly accountable for these variations. The land had, however, been overstocked; the grasses had been prevented from seeding, and this, with the spread of weeds, would account for the unfertility of the soil. Mr. Tucker said he had found it advisable to plough up some of his grass land to destroy this weed.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the past year seven meetings were held, with an average attendance of six members, which he trusted would be improved on this coming year. A successful Conference of Branches was held at Strathalbyn in March.

### Swan Reach, August 23.

Present—Messrs. P. A. Haase (Chairman), G. A. Zadow, J. O. J. Kohnke, F. Fischer, A. Fischer, P. A. Beck (Hon. Sec.), and two visitors.

**CROPS.**—Mr. Zadow said the crops on new land did not look so well as those on land cultivated for the second time. Members generally considered the season very promising, though the crops are somewhat backward.

**FEED FOR STOCK.**—Mr. Kohnke said he had been using cuttings from pine and sandalwood trees for his cattle, and they had kept in good condition. Some sorts of trees were more readily eaten than others, the sandalwood being much appreciated. He fed sixteen or seventeen cows on three or four pines per day; they seemed to like it better if the trees are cut a day or two before. Mr. Zadow had tried to keep sheep on sandalwood, myall, and pine, but had lost 160. If they get low in condition this feed seems to be injurious. He considered the blue-leaf pine best for cattle and sheep. There were a number of other bushes which had been used for feed, and the loss of stock in the district had not been very heavy. Reference was made to the fact that some plants appeared to be injurious to stock at certain seasons. Mr. Zadow said the Darling pea and wild melon were of this class, causing colic some seasons and being harmless at others. Mr. F. Fischer said he had even known of cattle killed by eating saltbush when they were not used to it.

### Arden Vale, August 16.

Present—Messrs. A. Hannemann (Chairman), C. Pearce, M. Searle, F. Schuttlöffel, and L. E. Warren.

**ANNUAL REPORT.**—The Hon. Secretary's annual report showed that during the year nine meetings were held, with an average attendance of eight members. Several papers were read and numerous practical matters discussed. The usefulness of the Branch has been very seriously affected by the terrible drought experienced, and many of the members had to go away with their stock. One result of the work of the Bureau was the generation of a feeling of dependence upon one another, which he believed would result in the near future in co-operation among the producers. Messrs. A. Hannemann, M. Eckert, and E. H. Warren were re-elected Chairman, Vice-chairman, and Hon. Sec. respectively.

**FEED FOR STOCK.**—Members reported that porcupine grass, black grass, and acacias had been largely used during the drought. Molasses and copra cake had also been used.

**FEEDING OFF CROPS.**—Mr. L. E. Warren initiated a discussion on the advisableness of feeding down the growing crop with stock. His experience was that in this district it was not a good practice, as the crops make no rapid growth in winter, and in loose soil horses destroy much of the plant by rolling and galloping about. Horses also eat off the crop very irregularly, and where stock are put on sheep will be best. Members generally agreed with Mr. Warren.

**TREE-PLANTING.**—Mr. Pearce read a paper on this subject, of which the following is the substance:—

He considered every farmer in the North should plant a few forest trees whenever we get a favorable season. Not only should they be planted for the purpose of providing shade and shelter, but also for timber for the next generation. If the country were well timbered it would be much better for all concerned. Trees should not be planted near fruit or vegetable gardens, as they simply encourage the birds, which are already a serious pest. In preparing the soil they could not do better than follow the advice of the Forest Department and plough the land as deeply as possible, taking into account the nature of



the soil. It is better to plough when the land is fairly soaked, but on clay soil this cannot be done. Neither is it wise to plough too deeply. He had simply planted the trees in large holes dug for the purpose, but this had not been successful. With care they could get the trees to do even in a dry season. Two years ago he planted a good number of trees, and in spite of the exceptional drought they had experienced, 30 per cent. had grown, some being 4ft. to 5ft. high, without any attention or watering. He considers the sugar-gum and pepper tree the best for this district. The latter is the hardiest and most handsome tree they had, growing in almost any situation, and he thought it a pity it was not distributed by the Forest Department. He believed it would pay them better to raise their own trees than to obtain them from the Government, seeing that they were so far from any of the nurseries. The best time for planting trees was in August or early in September. If planted earlier here they were liable to be injured by frost.

### Woodside, August 16.

Present—Messrs. R. Caldwell, (Chairman), A. Pfeiffer, J. W. Cuthbertson, C. W. Fowler, J. H. Snell, A. Lorimer, J. Hutchens, R. W. Kleinschmidt, R. P. Keddie, and G. F. Lauterbach (Hon. Sec.)

**CODLIN MOTH.**—The new codlin moth regulations were discussed. Members considered them to be detrimental to the best interests of the fruitgrowers.

**LUCERN.**—The Chairman said a resident of the district had cut about 13 tons of lucern hay from a plot of about three acres. He had informed him that it paid him well, and he had made as much as 15lbs. of butter per cow per week from cows fed on this hay.

### Bowhill, August 21.

Present—Messrs. W. G. F. Plummer (Chairman), W. Tyler, J. Gregory, C. Drogenmuller, J. Waters, E. Weyland, A. Dohnt, H. H. Plummer (Hon. Sec.), and two visitors.

**WATER CONSERVATION.**—Mr. Tyler initiated a discussion on well-sinking. He stated he had just had a well sunk to the depth of 250ft., and had obtained a good supply of water of good quality. The sinking cost on an average 8s. 6d. per foot, and he was confident that it was money well spent. He has already found much benefit from being able to draw water instead of having to cart it some distance, and strongly urged members to go in for water conservation, both by means of wells and dams on a larger scale than hitherto.

**WET SOWING OF WHEAT.**—The question was asked whether it was injurious to sow wheat in wet weather while wet from pickling, and members generally considered such practice conducive to hurt.

**ARBOR DAY.**—This passed off very successfully, the day being fine and bright, followed by a fall of over 1½in. of rain the following day.

**PAPER.**—The Hon. Secretary read a paper on "The Present and Past Depressions and how to Prepare for Same," in which he strongly advocated co-operation as the best means of getting higher prices for their produce, and paying lower prices for their requirements. He also urged the necessity for combining wheat-growing with dairying and the keeping of pigs and poultry. By doing this they were not so dependent on the weather, and lessened household expenses to a very large extent.

### Port Elliot, August 28.

Present—Messrs. C. H. Hussey (Chairman), H. Green, E. Wood, E. Hargreaves, W. Darwin, H. Pannell, J. Brown, P. O. Hutchinson, O. J. Whitmore, and E. Hill (Hon. Sec.).

**CANAIGRE.**—Mr. Hutchinson read description of Canaigre, the new tannage plant which is engaging so much attention in America.

**FRUIT PESTS.**—It was decided to support the action of the Tanunda Branch in their effort to secure the amendment of the Vine, Fruit, and Vegetable Protection Act.

### Stockport, September 6.

**Present.**—Messrs. F. Watts (Chairman), C. W. Smith, J. Smith, J. Smith, jun., D. G. Stribling, T. Howard, T. Megaw, G. Burdon, J. Murray (Hon. Sec.), and one visitor.

**CATTLE YOKES.**—Mr. C. W. Smith said he had recently seen a most effectual yoke for preventing bulls from breaking fences. It consisted of an iron yoke that fitted round the head, being clamped to the horns, and projecting above them in the shape of a hook. The two lower ends had holes bored in them and a bolt was passed through them and through the nose of the animal.

### Nantawarra, September 6.

**Present.**—Messrs. S. Sleep (Chairman), C. Belling, R. Uppill, A. L. Greenshields, and T. Dixon (Hon. Sec.).

**MANURING.**—It was decided to hold next meeting at Mr. Belling's residence to inspect crops put in with the seed and fertiliser drill. Mr. Greenshields said he had been trying several different manures, and found that wheat put in together with Thomas phosphate came up five days after sowing, with superphosphate seven days after, and with potash ten days after sowing. The drilled crops generally are keeping well ahead of those broadcasted.

**SEASON.**—Rainfall for August, 2.500in.; crops and feed are making good progress.

### Onetree Hill, September 3.

**Present.**—Messrs J. Bowman (Chairman), F. Barritt, H. H. Blackham, F. Bowman, G. Bowman, J. H. Elliker, J. Flower, J. Hogarth, F. L. Ifould, W. Kelly, E. A. Kelly, A. Thomas, and J. Lucas (Hon. Sec.).

**ANNUAL REPORT.**—The Hon. Secretary reported that during the year twelve meetings were held, with an average attendance of over eight members. During August the members visited Mr. J. H. Angas's stud farm at Kingsford, and were highly pleased with what they saw. Their experiments with Bureau seeds had not been a success, but this was no doubt due in a great measure to the season.

**TURKEY FARMING.**—Mr. F. Barritt gave an interesting address on this subject, of which the following is an abstract:—

He had had several years experience in this branch of the farming industry, and had been fairly successful. Results, however, depended very largely upon the season and the feed available, as the percentage of chicks that could be raised depended largely on this. The first point with the breeder should be to secure the best sort of turkey. The Bronzewing was a very popular breed, but he preferred a cross. As a matter of fact, however, the Bronzewing, although now recognised as a distinctive breed, was obtained by crossing the American wild turkey with the domestic bird, and it inherited too much of the wild nature of the bird of freedom to thrive successfully under the restraint necessary in the proper management of domestic fowls. Its plumage bespoke its breeding, and whilst the wild bird rarely exceeded 20lbs. in weight, the cross had occasionally gone up to 40lbs. He recommended a black cock with crossed hens, and the tamest hens should be selected

for hatching—birds you could go up to and take off the nest. Bronzewing hens had too much of the wild bird in them, as was seen by the way in which they would take alarm and run into hiding. The cock should be an ideal masculine bird with stout short legs, broad, and not too deep in the breast. Sometimes, in dressing a turkey for the table, it was found necessary to excise a portion of the breast bone in order to give it a plump appearance. A poulterer had told him that the black turkey was best shaped and commanded the best price. Time and attention must not be sparedly given, and the number of hens you keep must be regulated accordingly, to secure the best results. Even a dozen hens require a great deal of looking after to prevent their laying away promiscuously, and to avoid mixed settings of eggs in all stages of incubation. That such settings would be almost a complete failure would be seen by the fact that the mother hen would march off with the first couple of chicks that strayed from the nest. Leg rings should be used as marks and to indicate the various ages. Turkeys did not deteriorate with age like fowls; indeed, as long as they were healthy and strong, age was rather in their favour. Inbreeding must be avoided, as so bred, they were very liable to disease. Frequent change of the cock in favour of young birds was a mistake, as the best stock was got from male birds of four and five years of age. In the laying season, if your hens were disposed to wander, shut them in an acre paddock, provide suitable nests, and collect the eggs daily. Once the hens commenced sitting remove them to some place where the nests will be secure from the depredation of crows; a loose box would serve the purpose, as the space it would afford would be quite sufficient for a dozen or more sittings of eggs. Hens will remain wherever the eggs were placed, and if on occasion they should change places no harm would follow. Turkeys were persistent sitters, and would bring out two or three broods successively if allowed to sit without intermission; three was, however, too much, but two would not have any serious effect upon the strength of the bird. As food, grass was best, and was taken in preference to grain. One hen could take charge of two or three broods (average), and the hens thus relieved would, if well fed, soon start laying again. Chickens required insect food, grain being dangerous. To prevent the mother from wandering away from her brood it would be necessary to tether her, and a place should be selected where the grass was not too high, the chicks being apt to stray; and in wet weather the young birds should be cooped during the night. Very young chicks should not be turned out in the morning when the grass is heavy with dew. As the chickens advance in age more scope should be given them, and some device used to prevent the hen from rambling too freely. Hard-boiled eggs and dry curds were suitable food for young chickens; at a more advanced stage pollard might be added, and as they grow stronger they might be removed farther afield, or allowed to shift for themselves, to make room for their successors. A proof-fenced thirty-acre paddock could be utilised with very great advantage in turkey raising, as without sufficient run the industry was not likely to be a success. Clean water was indispensable, and water that was used in common for fowls and ducks did not do for turkeys. When grass was scarce, such food as melons, lucern, and kale, would assure a thriving condition during the summer. As turkeys consumed the olive greedily, and proved it to be excellent food, your paddock might be planted around with olives, care being taken to make your barren trees fruitful by grafting. When properly cared for turkeys were the most remunerative of all poultry; and where care was bestowed in perfecting suitable appointments for dealing with them they give comparatively little trouble. It was nothing unusual to get 7s. 6d. each for birds of a year's growth. With water conveniently near, and exposure to the sun provided against, each hen will bring out two broods in the season. One cock would be found sufficient for say thirty hens, as one egg fertilised would be a guarantee for a hen's complete sitting. The eggs removed from the nests during the laying period should be occasionally turned to prevent the yolk falling to one side, but when placed for hatching they require no further care in this respect.

### Robertstown, September 9.

Present—Messrs. N. Westphalen (Chairman), A. Day, H. Rhode, W. Armstrong, G. Dalatz, A. Rhode, B. A. McCaffrey (Hon. Sec.), and one visitor.

**FEED FOR STOCK.**—Members reported that sheoak, sandalwood, saltbush, and straw had been used for feeding stock during the drought, the former being largely used. Where they had too much of it, however, the cattle were killed. Those not used to saltbush did not thrive very well on it. Straw black with age, and pulled from shed roofs, was greedily devoured by stock in preference to last season's clean straw.

**PICKLING WHEAT.**—Considerable discussion on this subject took place, and members gave their experience on the subject. Mr. W. Mosey (one of the most successful farmers of the district) described his method of pickling. He has a large wooden trough, a wooden shovel, and wooden bucket, not too large. He empties a bag of wheat into the trough and then adds the pickle, made by dissolving  $\frac{1}{2}$  lb. of bluestone in a bucket of warm water. The pickle is poured over the seed, and thoroughly mixed with it by stirring with the shovel. In a short time the seed is shovelled into a bag already prepared, and the process repeated. In this way fifteen to twenty bags can be treated in a very short time, only two men being required—one to attend to the bluestone and its application, and the other to the wheat, both helping to bag up from the trough. Mr. Day wished to know whether there was any way of preventing "black rust" (*Urocystus oculata*). [I have never heard of any reliable remedy for this disease.—GEN. SEC.]

**SALT PATCHES.**—Mr. Day wished to know if there was any way of dealing with the salt patches which are becoming very prevalent in the district. [Plough deeply, pulverise thoroughly, fertilise heavily with farmyard manure, and grow mangolds and beet on salty soils.—GEN. SEC.]

### Finniss, September 9.

Present—Messrs. A. Willcock (Chairman), W. W. Heath, S. Eagle, H. Langrehr, and T. Collett (Hon. Sec.).

**BLINDNESS OF COWS.**—Mr. Heath stated that one of his cows, heavy with calf, is affected by a peculiar sort of eye complaint. Towards afternoon she becomes apparently blind, the ball of the eye standing out very much and covered with a film. The sight is so much affected that the animal cannot see where she is going. In the morning the eyes are all right, but towards midday she is again affected. [Several members of Branches have reported similar complaint of the eyes at different times, but the animals usually recover. The following treatment should be tried:—Bathe the eyes three times a day with 4ozs. of tincture of opium in a quart of water. If possible, keep the animal in the shade; and, if milch cows, keep a damp cloth over the eyes, and moisten it occasionally.—GEN. SEC.]

**MANURING.**—The Hon. Secretary reported that a farmer who had used Thomas phosphate this season told him he had got more crop on the land than he took off last year.

### Port Lincoln, August 20.

Present—Messrs. J. D. Bruce (in chair), S. Valentine, E. Chapman, J. P. Barraud, K. S. Browne, R. Puckridge, and Jas. Telfer.

**BRANCH SHOW.**—It was decided to hold the annual produce show in March next, and to invite the Lipson Branch to co-operate.

### Holder, September 3.

Present—Messrs. F. A. Grant (Chairman), E. Crocker, J. Maddocks, F. Rogers, J. O'Connell, P. J. Broughton, T. Basford, and J. J. Odgers (Hon. Sec.)

**SEEDS.**—Members reported that their Algerian oats were doing well, also Dart's Imperial wheat. The latter averaged twenty to thirty stools to the plant, some having as many as sixty.

**DAIRYING.**—At the instigation of the Branch, the Holder Village Association has purchased the pure-bred Ayrshire bull "Struan II.," of Golden Grove.

### **Mount Remarkable, September 8.**

**Present**—Messrs. A. Mitchell (Chairman), S. Challenger, P. H. Reichstein, W. Girdham, A. Pope, W. Lange, G. Yates, H. Blieschke, C. E. Jorgensen, T. P. Yates, and T. H. Casley (Hon. Sec.).

**BUSINESS.**—Discussion took place on several matters of local interest. Several members reported that the scarcity of feed and the lateness of the season has delayed fallowing operations.

### **Calca, September 4.**

**Present**—Messrs. Jas. Bowman (Chairman), W. Wilcott, A. Newbold, E. A. Roberts, D. P. Thomas (Hon. Sec.), and one visitor.

**WHEAT STACKS.**—The Hon. Secretary said he had seen a quantity of wheat that had been stacked with "cocky chaff" since last harvest. All the sacks were as sound as when put in the stack. Mr. Wilcott said he had practised this method of stacking wheat for years and always found it answered. He first put down a layer of cocky chaff, then a row of wheat, then cocky chaff, then wheat, and so on. It was most important that all crevices between the sacks should be properly filled with chaff, covering the last row with the chaff.

### **Colton, September 4.**

**Present**—Messrs. W. J. Packer (in chair), W. A. Barnes, A. A. Stephens, W. L. Brown, W. McElder, M. S. W. Kenny, and R. Hull (Hon. Sec.).

**DEPTH TO PLOUGH AND SOW**—A discussion took place on the best depth at which to sow wheat. Members were generally of opinion that it was best to sow the seed as deep as it is long. In reply to question as to depth of ploughing, members were of opinion that between 5in. and 6in. was the best depth to plough the average land on the West Coast.

**DAIRYING.**—At the suggestion of Mr. W. A. Barnes, it was decided to make a canvas of the district to ascertain how many residents were willing to unite in the purchase of a pure-bred dairy bull.

**BREAKWINDS.**—Mr. Packer wished to know which was the best and quickest growing hedge to plant as a breakwind to a garden on limestone country. Members favored the African box-thorn.

**SHEEP ON FARMS.**—Mr. Packer asked whether it was profitable for a farmer owning a few sheep to breed his own lambs, and, if so, which is the best breed. Members considered it decidedly profitable for the farmer to rear from seventy to eighty lambs each year. The best rams procurable should be mated with strong ewes. The Merino was considered the most profitable for the district generally, but where plenty of feed and water was available the crossbreeds might pay better. Members thought by using good rams and culling out the poorest of the ewes each year and disposing of them, the quality of the flock could be considerably improved at small expense.

**Clare, September 3.**

Present—Messrs. J. Christison (Chairman), W. Kelly, G. Lloyd, J. T. Hague, W. S. Birks, J. Treleaven, J. Radford, R. Yates, and W. Kimber (Hon. Sec.).

**EXPORT OF APPLES.**—Messrs. Geo. Wills & Co. wrote regarding the export of apples to Natal. The voyage was only of three weeks' duration, expenses under 3s. 6d. per case, and last year's returns from 14s. to 17s. 6d. per case.

**SPRAYING.**—A general discussion on this subject took place. Mr. Radford said he did not give his trees the winter spraying, as he considered it unnecessary; his experience was that the spring spraying accomplished all he desired. Mr. Hague said he sprayed with Bordeaux mixture just when the buds were bursting, and although at one time badly troubled with curl-leaf, he had been quite free since adopting this treatment. The Chairman said he was trying the lime, salt, and sulphur mixture for red spider.

**Tanunda, September 9.**

Present—Messrs. J. H. Walden (in chair), J. Basedow, C. Heinemann, W. Graetz, A. Ohlmeyer, P. Trimmer, T. Brock, G. Mann, W. Bietz, P. Heinrich, and E. Trimmer (Hon. Sec.).

**FALLOWING.**—Considerable discussion on this subject took place, members being generally of opinion that the rougher the soil was left the better, as the air had more effect when in a rough state.

**FEED FOR STOCK.**—The Hon. Secretary said Mr. J. C. Jacob, of Mooroo-roo, told him that he had been feeding his cattle on boiled prickly pear leaves with good results, and he had used a very large quantity of this material.

**UTILISING WASTE TWINE.**—Mr. Graetz tabled doormat made by himself from the waste twine from the sheaves of hay.

**Hahndorf, September 11.**

Present—Messrs. A. von Doussa (Chairman), F. H. Sonnemann, H. Spoehr, C. Jaensch, A. L. Paech, M. C. Bom, G. Sandow, H. Kerr, T. Grivell, J. C. Rundle, and D. J. Byard (Hon. Sec.).

**SEED EXPERIMENTS.**—The Hon. Secretary reported favorably of the Iceberg lettuce; it was compact, very sweet and tender, and a hardy plant, growing well, even on stiff soil. Two members reported failures with turnip and onion seed.

**DAIRYING.**—A discussion took place on crossing the Jersey breed on the common cattle, and some members thought it would eventually result in the cattle becoming very small.

**CODLIN MOTH.**—Several members strongly supported the proposal to make it compulsory for all boxes and bags to be disinfected in some manner before leaving the city markets, and thought there would be no real objection to a small charge, sufficient to cover the cost of the work, being made.

**Swan Reach, September 9.**

Present—Messrs. P. A. Hasse (Chairman), J. O. J. Kohnke, F. Fischer, F. F. Brecht, B. Schwartz, P. A. Beck (Hon. Sec.), and one visitor.

**FIELD TRIAL.**—It was decided to write to the different importers and manufacturers of hay harvesting machines, inviting them to send their machines to compete at a public trial to be held under the auspices of the Branch.

**WHEAT-GROWING.**—Members reported that the wheat crops looked well, and a fair amount of rain during the next month would assure a very good return. Mr. Kohnke said he was trying an experiment on about 200 acres of plain land. This was broken up last year, and he was now fallowing crossways, with the intention of sowing it early next season, as he believed he would get a good result from land treated in this way. The experience of the district was that the early sown crops gave best results, and he strongly advised members to put theirs in as early as possible. Mr. Brecht agreed. He also advocated more working of the land. His experience was that the additional crop more than paid for the extra labor. The Chairman also thought there could be no doubt that generally the more the land was worked the better the crop. This was certainly the case where he used to live, at Woodside, and he believed it would prove to be so here, although the deficient rainfall might make it somewhat more difficult to follow up.

**CATERPILLAR PEST.**—Mr. Fischer tabled specimens of “grub” which was appearing in immense numbers in his garden during the last few days, and were doing much damage to his mangolds, beets, and cabbages, and he was afraid they would also attack the wheat crop. He would like to know how to destroy the pest. [These are probably the caterpillars of some native moth. They could be destroyed by spraying the plants attacked with Paris green loz., lime 1lb., treacle or honey 1lb., in 12galls of water. It would not, of course, be safe to use plants so treated within at least two weeks and without washing thoroughly. A mixture of 8ozs. Paris green, 4lbs. molasses or treacle, and 30lbs. of bran, with enough water to make a thick paste, if broken up and distributed amongst the plants, is an attractive and fatal bait for several species of caterpillars.—GEN. SEC.]

### Millicent, September 2.

Present—Messrs. S. J. Stuckey (Chairman), H. Oberlander, G. Tantram, H. A. Stewart, H. Hart, W. Whennen, R. Campbell, and E. J. Harris (Hon. Sec.).

**CHUFA.**—Mr. Stewart tabled samples of chufa, or earth almond, grown from Bureau seed. This does well and is easily grown in this district, and as it contains a large percentage of oil, is fattening for fowls and pigs. Sandy loam and peaty soils suit best; the seed should be soaked in water till it loses its shrivelled appearance, then set  $\frac{1}{2}$ in. deep in rows 1ft. apart each way. The plants, the leaves of which resemble blades of grass, should be well watered throughout the season. The almonds grow at the root of the plant from 1in. to 2in. below the surface, and are about the size of large peas. In the autumn the chufa can be lifted with a fork and gathered. Six plants produced 1lb. of almonds.

**PESTS.**—A general discussion took place on the peach and apple aphides and the spread of noxious weeds in the district. It was decided to call the attention of the local authorities to the spread of the star thistle in the district.

**ROOT CROPS.**—The Chairman called attention to the value of white carrots. A resident had obtained 20 tons of roots from one acre, and found a ready sale for them at 30s. per ton.

### Balaklava, September 11.

Present—Messrs. C. L. Reuter (Chairman), W. H. Sires, J. Mills, J. Vivian, E. Roberts, J. Willmott, G. Reid, A. Steinwedel, and E. M. Sage (Hon. Sec.).

**EXPERIMENTS.**—It was decided to hold the next meeting at the Balaklava School, to inspect the experimental plots conducted by Mr. Willmott.

**FEED FOR STOCK.**—Mr. Steinwedel showed plant of saltbush (*Rhagodia Billardieri*), and reported that the bushes upon which the Hon. Sec's. horses had been feeding during the drought consisted principally of *Lasiopetalum*, *Dodonea*, and *Styphelia*.

### Arthurton, September 2.

**Present**—Messrs. W. Short (Chairman), W. H. Hawke, T. B. Wicks, W. Smith, J. Koch, H. Short, M. Lomman, H. J. Freeman, J. B. Rowe (Hon. Sec.), and two visitors.

**HOMESTEAD MEETING**—This meeting was held at the residence of Mr. Rowe, the members first inspecting the crops, which have been fed down owing to the scarcity of other feed. Generally they look well, considering the season and the treatment they have been subjected to.

**FIELD TRIALS.**—Mr. W. H. Hawke gave a statement as to the financial condition of the Bureau Field Trial Society, which was of a satisfactory nature. Reference was made to the good resulting from these trials, and to the forthcoming trial of harvesting machinery to be held near Kadina.

**MANURES.**—Mr. Freeman referred to the high cost of manures, and thought the farmers should unite to purchase manures in bulk, as by doing so they would effect a considerable saving. It was decided to write the directors of the S.A. Farmers' Co-operative Union asking them to import manures direct from Europe.

**RAINFALL.**—Recorded at Winulta for August, 1.697in. ; for eight months, 9.342in. ; at Tiparra, 1.702in. and 8.700in. respectively.

### Lyrrup, September 7.

**Present**—Messrs. A. Pomeroy (Chairman), D. Thayne, A. Thornett, E. J. Dwyer, W. Healy, F. E. Chick, T. Nolan, P. Brown, T. R. Brown, R. S. Cheek, W. H. Walling, D. J. Bennett, W. H. Wilson (Hon. Sec.), and one visitor.

**FRUIT PESTS.**—Mr. Dwyer called attention to the scale insect which was attacking the olive and lemon trees on the settlement. The Chairman said steps would at once be taken to spray them with resin wash. Members reported that there was an unusual prevalence of grey grubs (caterpillars) in the soil. They considered thorough working before planting anything would destroy most of these. Mr. Thornett reported that on many of the vines there was a dry woody excrescence on the stems. Messrs. Pomeroy and P. Brown considered this was caused through some injury, and recommended to cut them off and paint the wound with tar.

**LEMON STOCKS**—It was decided to ask the General Secretary which was the best stock for the lemon, and the reasons for same. [There is considerable difference of opinion on this subject, and the same points are claimed for the different stocks. Probably the lemon stock is mostly used, though orange stocks are much longer-lived, and are greatly favored by many competent nurserymen. For trees that are irrigated the Seville orange will probably be best, as it will stand more water without injury than the lemon.—GEN. SEC.].

**SHEEPBUSH.**—Mr. Pomeroy said he had two plants of African sheepbush (*Pentzia virgata*) about 1 ft. in height and spreading well.



### Mount Bryan East, September 11.

Present—Messrs. H. W. Collins (Chairman), R. Webber, W. H. Quinn, H. Wilkins, J. Prior, A. F. W. Polner, Jas. Doyle, and visitor.

**SEED EXPERIMENTS.**—The Chairman tabled splendid samples of Swede turnips and marrows from Bureau seeds. The turnips weighed 3½lbs without leaves, and 4½lbs. with the top leaves on. The marrow (Ironclad) yielded 143 well-grown marrows from three plants.

**PRESERVING GRAPES.**—Mr. Prior tabled samples of grapes which he had been experimenting with in order to test their keeping qualities. Many of the berries were as fresh and good as when put away.

**ROLLING CROPS.**—A discussion took place on rolling growing wheat crops. Some members were of opinion that the land should be rolled as soon as the crop is sown, as this gives better results than if the crop itself is rolled. Other members favored rolling when the wheat is about 6in. high, and following with a set of harrows to loosen up the surface. Others considered harrowing when at that height would pull up too much of the wheat.

### Mount Compass, September 14.

Present—Messrs. J. Youlton (Chairman), C. S. Hancock, A. J. Hancock, W. Gowling, M. Jacobs, E. Good, R. Peters, F. Slater, W. Wright, and H. McKinlay (Hon. Sec.).

**CATERPILLAR PEST.**—The Chairman reported having destroyed the “grubs” which were attacking the young onion plants by sprinkling finely ground salt, at the rate of 2galls. per acre, over the crop.

**BLINDNESS IN COWS.**—Mr. Slater stated that his cow, although getting better, had not recovered her sight properly. Several similar cases to that reported previously have occurred in the district.

**DRAINAGE.**—Mr. E. Good read a short paper on “Draining Swampy Land,” as follows:—

The main art in draining consists in digging your drains in the best possible place, and in such a manner that they will continue to be drains, and not, in the course of time, develop into creeks. All drains should have sloping banks, at least 1 in 3, otherwise they are likely to collapse, which will cause more trouble to rectify than if they were sloped when made. The fewer drains you can do with the better, as it is necessary to leave a path on either side of at least 2ft.; so that three drains on the block will require an area of 12ft. by the length of the block, in addition to the area of the drains themselves. Take, for instance, a block 10 chains wide and of two or three acres in area; if you can manage with two drains instead of three you save nearly 100 square yards of land. Drains should be at least 2ft. deep, but never, if possible, dig below or on to the sand, as there is too much risk of the banks being undermined. A mistake some fall into is in starting a drain and leaving it unfinished to do other work. This is sure in the long run to lead to loss. Complete the drain, and you will never regret it. If you begin at the bottom and work half way up the block you are liable to be flooded out, while if you commence at the top and leave the work unfinished, you will find when you come to complete the drain that the end is so choked with sand, earth, &c., that it will take a lot of extra work to put it right. Underground drains are a necessity on most of our blocks. There are several ways of constructing these, some of which are not within our means. One way is to dig the drain the size and depth considered necessary, place saplings or roots on the bottom, then cover with 4in. to 6in. of brambles, either in bundles or loosely, finally covering with soil. The objection to this is the liability of its blocking with a rush of water, or choking with rubbish. A better way is to dig the drain 6in. under the required depth, then clear out the bottom to a depth of 6in., leaving a ledge on either side. If you want a drain 12in. wide you will require to excavate a width of 18in. at the surface, so that at the bottom you have a ledge 3in. wide on either side. On this ledge place slabs, or bundles of brambles securely fastened together—the former for preference, if obtainable—leaving a clear passage 6in. deep by 12in. wide at the bottom. If the bottom of the drain is not firm enough to make secure ledges, stakes should be driven in to carry the weight.

Members were of opinion that drains should be closer, say one chain apart, with a head drain to distribute the water evenly. Mr. Jacobs advised using earthenware pipes for underground drains, but members considered the expense put them out of their reach.

### Mount Pleasant, September 17.

Present—Messrs. G. Phillis (Chairman), W. M. Vigar, W. Lyddon, P. Miller, jun., J. F. Miller, J. Maxwell, F. Thomson, J. A. Naismith, H. Drago-muller, R. Godfree, J. McConnell, and H. A. Giles.

**SEED EXPERIMENTS**—The Chairman reported that the pie melon received last year from Central Bureau was a very good variety, some of the melons weighing 74lbs. each. They were of a dark-green color, and very firm.

**PAPER**.—Mr. Maxwell read a paper on "The Care of Manure," of which the following is the substance:—

As a rule I do not think our farmers make half as much manure as they might do. In the old country the farmer takes care of everything that can be turned into manure, and there is no reason why the same should not be done here. Of course manure cannot be made here to the same extent, as we do not have to house our stock for six months of the year, neither do we feed them so well. We cannot expect our land to produce good crops unless we return something to replace what is taken out year after year, so that it is necessary to devote some attention to the production of manure on the farm. In the first place, every farmer should save a good stack of straw, instead of burning it off. The straw may be built on two sides of the stable or stockyard, providing both food and shelter. When the animals pull down more than they can eat, the surplus may be used for bedding. The yard should be well lined with straw to keep it dry in all weathers. The manure from the stable should be spread in the yard to be trod into the straw by the cattle. Pigs should also have plenty of bedding. I have seen them wading to the bellies in filth. Apart from the manure, of which there will be a considerable quantity, bedding is necessary to keep them clean and healthy. It must be remembered that, although the straw in itself is of little value as manure, it absorbs and saves the urine, &c. The droppings from the fowls and the ashes that are generally thrown away will be found of value, especially as a top-dressing for grass lands. The dunghcap should be well packed to prevent overheating and consequent waste. It should be trenched over four or five weeks previous to being spread on the land, and covered with a thin coating of soil to prevent evaporation. When the manure is carted on to the land it should be spread and ploughed under as soon as possible; plough it under the same day as you spread it if you can. Where convenient sheep may with advantage be yarded on the land to be ploughed the following season. Hurdles on wheels are the handiest, and should be shifted about every second day. It may seem a lot of trouble, but you get the manure evenly distributed over the whole area, and splendid crops follow. Sheep invariably camp on high ground, and very often in the same place, so that unless hurdling is resorted to some parts get no manure and others too much. I am not prepared to say how much farmyard manure per acre should be applied, but I would certainly prefer a thin dressing over a large area to a thick one on a small area, and leaving the rest without any at all. I do not advocate the use of farmyard manure to the exclusion of commercial fertilisers, but certainly advise farmers to make as much manure on their farms as possible.

**WEEDS**.—Mr. Giles reported that in a crop of barley from seed obtained by him from Yorke's Peninsula there was a considerable quantity of "bastard turnip" and tares. This showed the necessity for exercising every care in purchasing seed.

### Dowlingville, September 10.

Present—Messrs. R. A. Montgomery (Chairman), T. Illmann, H. Crowell, G. Mason, T. Kenny, J. Birkin, W. T. Holland, R. Willing, J. Phelps, and F. W. Roberts.

**FIELD TRIALS**.—Matters in connection with the forthcoming field trial of harvesting implements at Kadina were dealt with. It was decided to ask the members for the district to endeavor to secure Government assistance in aid of these trials.

**NAME OF BRANCH.**—It was decided that the name of the Branch be changed from Clinton Centre to Dowlingville.

**MANURES.**—Members wished to know best manure for poor soils, and for topdressing crops. [Depends entirely upon the character of the soil and the crops to be manured. To topdress cereal crops, probably  $\frac{3}{4}$  cwt. to 1 cwt. of sulphate of ammonia or nitrate of soda will give most satisfactory results. The other question cannot be answered without more definite particulars. GEN. SEC.]

**ALGERIAN OATS.**—Members were of opinion that Algerian oats for hay are best when cut on the ripe side.

**WHEAT EXPERIMENTS.**—Mr. Mason tabled wheat plants, showing results of deep and shallow sowing. When drilled in deeply the plants had put out fresh roots near the surface. Mr. Willing tabled plants drilled at the same time, some with manures, others without, showing benefit of manuring,

### Golden Grove, September 14.

Present—Messrs. T. G. McPharlin (Chairman), W. Rhen, F. Buder, G. C. Fead (Hon. Sec.), and two visitors.

**FEED FOR STOCK.**—Members suggested bamboos (*Arundo donax*, or “Spanish reed”) might be more largely planted by farmers, as in addition to being serviceable in other directions, horses and cows were very fond of the green tops, which grow again very rapidly in hot weather. The garden artichoke, which grows profusely in this district, is largely used, and is recommended by members for use, either at the end of the summer when the grass is gone, or as ensilage.

### Mylor, September 11.

Present—Messrs. W. H. Hughes (Chairman), J. Roebuck, S. Roebuck, R. S. Mundy, W. T. Elliott, E. J. Oinn, W. Nicholls, S. Pearce, W. P. Probert, A. Hampton, F. Wilson, W. G. Clough (Hon. Sec.), and nineteen visitors.

**RYE.**—Mr. J. Roebuck wished to know the name of the earliest maturing rye, so that members would know what to ask for when purchasing. He tabled a very indifferent sample grown from seed purchased from an Adelaide seedsman as one of the best varieties, and for which he was charged 7s. per bushel.

**GREEN MANURING.**—Mr. Nicholls read the following paper:—

The subject of manuring is very interesting to all who are engaged in the cultivation of the soil, but it is especially so to the growers of this district, because our lands will not produce paying crops without it, and the crops principally grown here are such that require annually a large supply of plant food. How to supply the maximum amount of plant food at a minimum of cost is a very important question. The quantity of stable manure produced on our holdings is not nearly sufficient for our needs. The long distance and heavy haulage from the city makes this class of manure altogether too expensive. We are therefore compelled to seek it in some other form—that most generally adopted being artificial or commercial fertilisers; and while this must necessarily be the principal source from which the constant drain on our land must be replenished, yet I think that something else must be done to keep our land in a high state of fertility. The use of artificial manures does not supply the humus, or bring about that necessary mechanical condition of the soil which is produced by the constant use of stable manure. The question arises how are these conditions to be obtained, and I think the answer is by growing and turning under green crops. All green crops when turned under benefit the land, but I think it is only plants of the leguminous order that can be profitably regarded as green manure. It is now generally known that these plants gather nitrogen from the air and store it in the plant and roots, where it becomes available for succeeding crops. The following shows the

yield per acre of such crops grown at the Storrs, U.S.A., Experimental Station, the quantity of nitrogen in such fodder and also in the roots and stubbles, and how much stable manure or nitrate of soda would have to be applied per acre to furnish as much nitrogen as the crop contained.

	Yield per Acre in				Equivalent of	
	Fodder.		Roots and Stubbles	Total	Farmyard Manure.	Nitrate of Soda.
	Tons.	Lbs.	Lbs.	Lbs.	Tons.	Lbs.
Cowpea vines .....	9.4	95	22	107	10.7	713
Soja bean vines .....	9.1	75	14	89	8.9	600
Horse beans .....	17.5	171	32	203	20.3	1,335
Vetch .....	12.0	153	27	180	18.0	1,200
Red clover .....	11.4	114	44	158	15.8	1,053
Lupins .....	18.4	116	13	129	12.9	860
Crimson clover .....	12.0	127	41	168	17.0	1,150

Then again, from trials carried out at the New Jersey Experiment Station, the amounts of plant food gathered by an acre of lucern in two years were equivalent in nitrogen to that contained in 3,500lbs. of nitrate of soda; in phosphoric acid to that contained in 600lbs. of bone black superphosphate, and in potash to the amount contained in 1,200lbs. of muriate of potash. These amounts of plant food would cost over £30. Most of the nitrogen is evidently taken from some other source than the soil, while the potash appears to have been obtained by the long roots of the plant from the deeper layers of subsoil; and the same is true, to some extent, of the phosphoric acid. Very similar results have also been obtained by the New South Wales experimental station from crimson clover. From these experiments it will be seen how much of the nitrogen, which is so necessary to most of our crops, and which costs us so much when obtained in the form of commercial fertilisers, is obtained practically free of cost; for I am confident that the improved condition of the soil and other advantages gained, apart from the nitrogen won, will more than repay the whole cost. From amongst the many leguminous plants we may choose those suited for any season of the year, and that is a matter of the greatest importance to us, because we are thus enabled to enrich our land in this way at a time when it otherwise would be lying idle. I have this year tried crimson clover, which I sowed in April, and it grew to about a foot high by the beginning of August, thus giving plenty of time for turning under for a spring crop; and as this plant possesses a very high value as a green manure, I think we cannot do better than try it, as I believe, apart from the nitrogen it gathers, it will do much to conserve the potash and phosphoric acid which would otherwise be lost by being washed out by the heavy winter rains. In conclusion, let me say that I believe our land can be brought to a fertile state, and maintained at that level, by green manuring, and at less cost than by any other method.

### Hartley, September 15.

Present—Messrs. C. Harvey (Chairman), G. Jaensch, H. Reimers, A. McDonald, W. Klenke, W. Kutzer, A. Thiele, A. Dalton, J. B. Sanders (Hon. Sec.), and one visitor.

**GELDING STOCK.**—Considerable discussion took place on this subject. Mr. Jaensch said he had always noticed that stock gelded in the fall or last quarter of the moon did better than those operated on at other times. He advised keeping the animals on the move after being gelded, in order to prevent them from getting stiff.

**WASTE TOBACCO.**—Mr. Harvey wished to know where damaged tobacco could be obtained for making tobacco wash for spraying. [The midribs and stems not used by the manufacturers can be obtained on application to the Government Storekeeper, Port Adelaide, at 3d. per pound. Damaged tobacco can at times be purchased from the importers at various prices.—GEN. SEC.]

### Gawler River, September 7.

Present—Messrs. A. M. Dawkins (Chairman), T. P. Parker, J. Hillier, A. Bray, G. Johnston, F. Roediger, J. Badman, J. Bushbridge, A. Hatcher, E. Dawkins, H. Roediger (Hon. Sec.), and four visitors.

**CAULIFLOWERS.**—Mr. Parker said his cauliflower plants were developing very small heads and curly leaves. He wished to know the cause of this. The Hon. Secretary thought it was probably due to the seed being old and run out.

**ARSENICAL SPRAYS.**—The Hon. Secretary said a recent issue of the *Australische Zeitung* contained report of trials at the Michigan Experimental Station of a new spray for gnawing insects. It was made by dissolving 2lbs. of white arsenic and 4lbs. of washing soda in 2galls. of boiling water in an iron pot. This took about fifteen minutes. When cold it is put away in an earthenware vessel. For spraying 2lbs. of fresh lime is dissolved with a small quantity of water, then mixed with 40galls. of water and one pint of the arsenic mixture is added. The whole is thoroughly stirred, and, if necessary, is strained before using. The advantages of this preparation are its cheapness, shows plainly on the trees, is very effective, and does not injure the foliage.

**SHEEP.**—Mr. E. Dawkins showed photographs of Merino and Shropshire sheep, and initiated a discussion on the relative merits of the different sheep. No other sheep equalled the Merino for wool, but the Shropshire was better for mutton. A cross between the Shropshire ram and Merino ewe resulted in the best of lambs for market. The Merino ram crossed with Lincoln ewes also produced good lambs, but not equal to the former. The Shropshires were docile, broader, and more meaty, and with longer and better wool than the Southdown. The Chairman asked what advantage sheep were to the land. He thought they were better than large cattle for feeding off the fallows, as they did not tread the land down so much. The fallows would, however, require working just the same. Mr. Johnston said he had lost wethers feeding on stinkwort. The Chairman said he had sometimes lost ewes in lamb from this cause, but never wethers. Mr. E. Dawkins said at present the wool of the Shropshire was higher in value than the Merino, and a wether of this breed was at its prime at nineteen months. They were best for wool at two to three years. If kept fat they produce more wool than if in poorer condition. Mr. Johnston considered a half-fat sheep grew more wool than a fat one. Members were of opinion that wires 6in. apart, and kept tight, made best sheep-proof fence.

### Forest Range, September 16.

Present—Messrs. J. Vicars (Chairman), G. Monks, W. Cherryman, J. Rogers, J. Sharpe, H. Waters, J. B. Fry, C. Stafford, H. G. Caldicott, A. Green, J. Green, R. M. Hackett (Hon. Sec.), and three visitors.

Mr. J. Vickers read the following paper on "Fighting the Frost":—

In doing this I daresay you will think I have undertaken a fairly large contract, especially as I do not pretend to be a professional frost fighter, but rather seek for information as to the best mode of doing it than to give you the benefit of my experience, which is practically nil. Notwithstanding this, I will endeavor to suggest some simple, inexpensive method of dealing with it, which, if it does not vanquish the enemy, may perhaps check him a little. I feel assured that anything we do this season need cost very little money or trouble, and may still be of some benefit. I should like to mention also that I shall deal only with the valley below us, as I consider it the worst place in the district for frost, and also the easiest to unitedly work for combating the evil. Ten years ago I believe there were few places in the colony better suited for the growth of the raspberry than that part of our district known as Blackwood Creek, but unfortunately, as year by year more land is cleared and the natural shelter destroyed, we are greatly troubled by frosts. I think I am well within the mark in saying that during the last three years we have lost fully two-thirds of our crop from that cause. The question

therefore arises are we to go on in this way or try to find a remedy? My opinion is that it would pay better to stop growing altogether and put the land to other use than to continue raspberry growing under the present circumstances. In thinking the matter over I first came to the conclusion that the most natural remedy would be to grow new shelter in the form of high, thick hedges, and, as our valley runs north and south, and the frost generally comes with a south wind, we should need to put them east and west, and I should think at short intervals. But this plan would have its drawbacks. In the first place we must wait for the hedges to grow. After they had grown they might be in the wrong place; they would also be in the way of the cultivating implements, and would shelter a lot of pests, such as sparrows, codlin moth, &c. I think, therefore, that we could not do better than try smoke. This is no new thing, as it is being used year after year in many places, especially for vines, orange trees, &c. In some of the large orange gardens of California it is carried out very elaborately, thermometers being fixed close to the ground with electric wires attached in some way, so that on the temperature reaching freezing point a bell rings, and the men get up and light fires that are prepared beforehand for the purpose. It is also carried on in a somewhat different style on a small scale at Angaston, where they use a 200-gall. tank cut in halves and placed on wheels, with the fire made on wires stretched across, and draw it between the vines with, I believe, beneficial results. That, of course would be impossible with us, but I think with less trouble and very little expense we could give smoke a fair trial. I am of opinion that the sun coming suddenly on the frosted plants is the cause of the mischief, as on cloudy mornings it does no damage, so if we could fill the valley full of smoke (make artificial clouds so to speak) we should save our crop. The chief difficulty is rising early enough in the morning; and that is the chief argument in favor of united action, as most likely one of us would awaken, and a boy on a horse would arouse the whole valley in a few minutes. As the period is so short in which the frost does harm to raspberries, possibly one or two mornings would be sufficient for the purpose. With regard to fires, I would suggest that the old canes be put in heaps at convenient places, and that each of us procure a drum of tar or a tin of kerosine, or both, which, for economy's sake and to save carrying, could be filled into bottles or other small vessels, and one or two placed near each heap of rubbish. This would give the fires a start. After that pile on anything that is handy: green boughs are plentiful, old potato tops, heaps of half-rotten grass, the smaller prunings of our fruit trees, sawdust, if easily procurable, in fact, anything that will smoke should be carted to these places and left there until required for fighting the frost.

Members considered this a most important matter for this district, as raspberries form one the staple products of the district, and it is estimated that within a radius of three miles of the Forest Range school, quite twenty tons of raspberries have been lost during each of the past two years through frost. Mr. Monks considered hedges useless except for shading the beds, and for this they should run east by north. Smoke would be best if they could make a heavy enough cloud, but he was afraid they would be at a loss for material. His potatoes under shelter were hardly touched by frost, whilst his neighbors were cut black on unshaded ground. Mr. J. Green said the injurious frosts occurred on still nights during November. Frost is worse in dry seasons. He has had raspberries against a hedge cut, but not on the rise. Shelter was no use unless protected from the east. He had tried watering potatoes on frosty mornings, but it was of no benefit. Mr. Rogers said his raspberries were cut by frost with a southerly breeze. Thought fires would have to be kept going all night to warm the air. Watering might pay better, having several tanks with three or four sprinklers to each. He knew of gardens surrounding by saplings which were never cut by frost. Mr. A. Green thought frosts were worst on clear nights after a south wind. He found hedges no protection, and thought if they could get a thick enough smoke in the gullies it would be all right. The greatest danger was during the second week of November. Mr. Sharpe said he noticed from Californian reports that they light their fires when freezing point was reached; it was no use afterwards. He found watering of no use. Mr. Cherryman said watering potatoes before the sun gets on to them prevents much injury. Mr. H. Green said the trouble was, the smoke would not settle on frosty mornings, so they would need to have fires across the gullies. The heat from the fires would not be sufficient to do any good, and watering was useless with a severe frost.

Several members agreed that shelter from the east was decidedly beneficial, and that the damage from frost became worse as the gullies were cleared. It was decided to carry out an experiment with smoke fires to test their utility in this district.

### Clarendon, September 16.

Present—Messrs. James Wright (Chairman), A. Harper, J. Spencer, J. Chapman, J. Piggott, H. Payne, A. A. Harper, W. Spencer, W. A. Morphet, J. Juers, W. H. Steer, G. Tester, and A. L. Morphet (Hon. Sec.).

CONGRESS AND AGRICULTURAL COLLEGE.—Mr. Harper reported on the proceedings of the Ninth Annual Congress, which he considered a great success. Mr. Wright reported on visit of inspection paid to the Roseworthy College. He was very much pleased with the appearance of the place, and thought much information could be obtained by farmers visiting the College. He hoped more land would be placed at Professor Lowrie's disposal.

BRANCH SHOW.—It was decided to unite with Cherry Gardens Branch in holding their annual produce show, as members considered one large show better than two small ones.

Pigs.—Mr. A. A. Harper read the following paper on "Pig Keeping":—

I find that the best results are obtained by mating a good bred boar with a large common sow, as the progeny takes after the male, and the common sow throws a larger litter than most purebreds. In-breeding is not advisable, as I have found by experience. There is not much profit in pigs if you have to keep them penned up and fed, but if you have a yard or small paddock in which to let them run and pick up for themselves, giving them a drink of milk twice a day, they will keep in fair condition, and when required can be shut up, fed well, and they will then be ready to kill in a few weeks. A fat sow is not so prolific as one in a moderate condition. I would advise anyone who can make his fruit garden pig-proof to do so, and let the pigs run in it, as they will pick up the weeds and fallen fruit, and will by this means assist in keeping some of our worst pests, especially the codlin moth, in check. Several neighbors have visited my garden and endeavored to find the codlin moth there, but without success, though it can be found in my neighbor's garden. I attribute this to a certain extent to the fact that my pigs are allowed to run in the garden. I find it does not answer to feed meat in a raw state to pigs, as it encourages them to eat their young. For fattening purposes I have tried copra cake mixed with milk, but get better results from pollard. To feed milk fresh from the factory does not do, as it blows them, and they frequently die. If a little soda or salt is added this does not occur. Members did not think it would be profitable to allow the pigs to run in a well kept garden.

### Maitland, September 4.

Present—Messrs. C. F. G. Heinrich (Chairman), C. E. Moody, A. Jarrett, H. Bawden, J. Smith, J. S. McLeod, Thos. Bowman, J. W. Shannon, O. Treasure, H. R. Wundersitz, J. Pitcher, and C. W. Wood (Hon. Sec.).

MANURING.—It was decided to ask Professor Lowrie to speak on the use of artificial manures at the Minlaton Conference, with special reference to the effect of manures on the soil, as some of the members think that such manures will ultimately lead to the impoverishment of the soil. A long discussion took place on the cost of manures, members being of opinion that there was altogether too great a margin between the English retail prices and the South Australian charges, and if possible a scheme will be formulated next winter to enable the local farmers to purchase direct from the English manufacturers.

WATER CONSERVATION.—The Hon. Secretary read the following paper on this subject:—

Among the many lessons that the past disastrous season has taught us, I think that the chief are the necessity for conservation of water and feed by farmers. I purpose to deal with the water question. I suppose that all, or nearly all of us, have had to cart water for our

stock during at least some part of the past summer. Of all the thankless hard work that has to be done by farmers, nothing equals water-carting. Water we must have, or our stock perish; all other necessary work must give place to it, it costs a lot of money, horse-feed, wear and tear, and greatly delays all ploughing and seeding operations, and even then the stock do not, as a rule, get enough water to thrive well. Most farmers in this district have made fair provision for storing water, providing they get the water to store, but now and again comes a season when there is not enough rain to fill our dams and tanks, and then comes a rush to Government reservoirs, wells, &c.; so it seems to me that we should provide storage to contain enough water to last from one and a half to two years. If so, let us consider what is the best way to do it. Is it best for the farmers to do it for themselves, or to try to get the State to do it for them? Best, I say, to do it ourselves, though the dams, wells, tanks, &c., that have already been provided by the State could be and should be better managed than at present, and should be in the hands of district councils, not private persons. In this part of Yorke's Peninsula the water in wells is either a very strong brine, or is impregnated with minerals to such an extent as to make it useless, so we must have either dams or tanks. Before starting either of these a good catchment area is necessary, and we have not all got good natural runs; still a good catchment may be made almost anywhere at a really small cost, so as to collect nearly every drop of water that falls, and that perfectly pure and clean. With an 18in. rainfall one square chain would give us 42,500galls. of water, and if most of us had that amount in addition to our present storage capacity, a dry season now and again would not be of such serious moment as regards shortness of water. Choose a square chain of fairly level land, having, if possible, a slight slope one way. Clear off all bushes, tussocks, &c., plough it, harrow it down as fine as possible, roll with a heavy roller after rain, spread 40 cubic yards of fine limestone rubble, giving a coating of about 3in., then spread 30bush. of sifted lime over it, harrow well, and roll several times with heavy roller after rain, beating out hoof marks with a rammer. A wall about 1ft. high round it, so that all water runs to the lowest point, thence into a tank, and you will save almost every drop that falls, and if fenced in and occasionally looked after, you have a lasting and perfect catchment. This is not theory, but is practical, as I have seen it done; it costs nothing to the farmer but his labor, and if a tank is too expensive, a covered dam may be used instead if the clay is good, and an area of two square chains suited for a catchment. Now, as to whether we shall have dams or tanks, much may be said in favor of either. If tanks are covered there is little evaporation, so we can use all the water we catch. With dams the evaporation is very great, about 6ft. per annum, I believe. With tanks, however, we must draw all the water for stock, while with dams we need not leave that labor. I believe our best plan is to have as many dams as we can, and one or two good tanks in addition as a stand by. With dams the main thing is to keep them clean. Clean them out whenever they get dry enough; do not leave it for two or three years. Remember the bottom part of the dam is the most useful, as evaporation takes place from the top. As to the quantity of water we want, we may roughly reckon 4,000galls. per annum for each head of great cattle, and 350galls. per head for sheep.

A good discussion followed. Members were of opinion that in order to be safe, farmers should have storage for from eighteen months to two years' supply of water, as wells are not a success in this district.

### Richman's Creek, September 13.

Present—Messrs. W. Freebairn (Chairman), A. Knauerhase, J. A. Knox, A. Nicholson, E. Roberts, J. J. Gebert, J. M. Kelly, J. McSkimming, P. J. O'Donohue, W. J. Wright, J. J. Searle, and J. McColl (Hon. Sec.).

**SUMMER FODDER.**—The Hon. Secretary reported having obtained 2cwt. of Early Amber Cane and Planter's Friend seed for members, at cost of 6d. and 4d. per pound respectively. The railway freight to Kingswood amounted to 6s., but owing to the method of classifying goods on the railway he learned that the same quantity of maize would have been carried the same distance for just half that sum. Mr. Wright said he had scarified some of his fallow, sowed the seed broadcast, and then harrowed it in. The Hon. Secretary said he preferred sowing first and then scarifying it in, as he then covered it to a greater depth, and secured more moisture against the seeds.

**LOCUSTS.**—Members reported that several patches of young locusts were noticeable and thought they could easily be destroyed on land that was being



followed by ploughing round them until the whole piece was turned over, burying them, or at any rate starving them, as they could not travel far without food at this stage. [Why not try the effect of rolling, or drag bushed harrows over them? This is but little trouble and might be very effectual. —*GEN. SEC.*]

**RAINFALL.**—Recorded for August, by Mr. Freebairn, 0·655in.; by Messrs. McColl, 1·100in.

### Penola, September 18.

Present—Mr. D. McKay (Chairman), Dr. F. Ockley, Messrs. W. Miller, J. W. Sandiford, J. A. Kiddoch, D. Balnaves, H. Ricketts, E. A. Stoney, L. W. Peake, and T. H. Artaud (Hon. Sec.).

**GYP SUM.**—Considerable discussion took place on the advantage of using gypsum with farm manure.

**LATE CROPS.**—In reply to inquiry, members thought wheat, if sown now in this district, might be profitable if the season turned out wet.

**HARVESTING RYE.**—Members would like to know the best time for harvesting rye for hay. [Will Branch members consider this question.—*GEN. SEC.*]

**SCIENCE CLASSES.**—Dr. Ockley thought the establishment of agricultural science classes, as advocated by the Stockport Branch, would be of great benefit to the colony. He was afraid there would, however, be some difficulty in securing a regular attendance at such classes.

**FEED FOR STOCK.**—Dr. Ockley tabled sample of copra cake, which he was feeding to some of his cows. He could not yet see much benefit from it.

### Gladstone, September 3.

Present—Messrs. J. Tonkin (Chairman), E. Coc, J. Brayley, C. Gallasch, T. Hortin, J. Shephard, J. King, B. Griffiths, J. H. Rundle, E. Matthiesson, J. Milne (Hon. Sec.), and two visitors.

**VISIT TO FARM.**—Members met at the residence of Mr. Coc for the purpose of inspecting the farm and growing crops, including the Government experimental plot.

**SEED EXPERIMENTS.**—Mr. Hortin tabled nice samples of All-head cabbage from Bureau seed. He spoke well of this variety.

**HEADERS AND STRIPPERS.**—Considerable discussion took place on headers for threshing *versus* strippers. Most of the members thought wheat threshed by the header is better for seed than if stripped, as the grain is not cracked so much.

### Johnsburg, September 4.

Present—Messrs. F. W. Hombesch (Chairman), H. Napper, T. A. Thomas, T. Thomas, M. L. Read, E. Holder, J. Sparks, T. Potter, L. Chalmers, W. James, G. H. Dunn, P. Caughlan, M. McRitchie, T. Johnson (Hon. Sec.), and two visitors.

**MANURES.**—Mr. Napper read the following paper on “How to Produce our own Fertilisers” :—

For producing manures or fertilisers for the purpose of using in connection with the seed drill it of course stands to reason that all manures, or anything that will answer the purpose of a fertiliser which is to be conserved on a farm, must be kept absolutely dry, and for this purpose it may be necessary to construct a building or shed that will answer the purpose, and resist the wet and damp. Such a structure need not be necessarily expensive, and any farmer has only to exercise a little judgment to erect a simple structure

that will answer his requirements, and keep the contents in a thoroughly dry state, so that it may be reduced easily to the proper consistency to enable it to pass through the drills in a powdered form when sowing. In collecting the various constituents suitable for fertilisers it is a well-known fact that there are large quantities going to waste throughout the year, and among these may be mentioned wood ashes, manure from the fowl-houses and farm and sheep yards. These should daily, or as often as may be convenient, be saved, and stored in the building set aside for the purpose, because by lying about the farm and being subjected to all kinds of weather they are reduced in strength and lose much of their value as manure. Before passing on I would not advocate using sheep manure too freely, because it has a tendency to heat, and, if used somewhat heavily, would require plenty of rain to ensure success by its use. You all know how valuable lime is when used as a fertiliser for many kinds of soils, particularly those of a clay nature. I would suggest a quantity of lime being burnt, and kept in readiness for use as required. It might be kept in a separate place, so as to ensure the proper quantity being gauged when mixing with the other fertilisers. As regards the quantity to be used per acre, I would advocate sowing, say, 1 bush. of lime per acre, and about 1 cwt. of manure. This would require about  $\frac{7}{8}$  tons to each 100 acres. Where plenty of bones are procurable it would be a good plan to prepare some, and use in conjunction with the other manures. When preparing for use the fertilisers would have to be reduced to a fine consistency to enable it to pass through the seed drill, and this could easily be effected by sifting, care being taken of course to use a fine sieve. During spare time the manures might be bagged, and so be in readiness for use as required. My idea in preparing this paper is to convey the fact that there may be some who are not in a position to purchase expensive manures; consequently where fertilisers are produced on the farm, especially where the rainfall is uncertain, there would be no heavy outlay in this direction, and, should the season be a failure, there is no loss in the purchase of manures to regret. And again, where the farmer knows accurately the value of those conserved by himself, and the nature of which they are composed, he can console himself with the reflection that they are in the ground for another crop because there is no danger of these fertilisers evaporating. I firmly believe that it will pay to drill in wheat, and if my plan is carried out I am confident it would result in good, and the land could be kept in good heart in a most economical and inexpensive way. Of course, when collecting refuse off the farm for fertilising, we must be careful not to save anything that contains seeds of weeds, such as drake, oats, &c. For instance, the pig-sty would have to be approached with caution, or perhaps left untouched. In conclusion, I would advise everyone to exercise judgment in the quantity to be used per acre, because probably light or limestone soils would require less than the quantity mentioned above, while the stiff, clay soils, or those that have a tendency to set closely after wet, would perhaps require more than the ordinary quantity per acre.

Members generally favored manuring, but some thought a pit for manure preferable to keeping it in a dry state. Mr. Holder thought much of their northern soils would be better for the addition of a little sand, as they were stiff, and were apt to set hard soon after rain. Mr. Potter advocated putting the manure on the fallows to grow a crop of grass before breaking it up again for wheat. He also recommended using bonedust in this district. Members generally thought Mr. Napper's plan a good one, provided care were taken that the manure did not contain seeds of weeds. Mr. Napper said he quite believed the seed drill would almost completely do away with the broadcasting of seed, and as in some cases it might not be possible to purchase fertilisers, something could be done on the plan he suggested in order to secure manures suitable for use in the seed drill.

**VERMIN IN HORSES.**—The Chairman said his horses were badly infested with vermin, and asked for a remedy. Mr. Sparks said he bathed his horses with 1 oz. of carbolic acid in 4 galls. of water with very beneficial results. Most of the members recommended insectibane, which although rather expensive if many animals had to be treated, was effective.

**CATTLE DISEASE.**—Mr. Masters, a visitor, said two of his cows had large lumps growing on the side and neck. The lumps on the first cow affected had broken, and she appeared to be getting better. Her heifer calf was also affected. The milk from these cows had not been used, and he would like to know what was the cause of the complaint. The lumps grew in size rather quickly.

### Tatiara, September 11.

Present—Dr. Murray Gibbes (Chairman), Messrs. M. Whelan, H. Killmier, Jos. Green, and W. E. Fisher (Hon. Sec.).

**MANURING.**—The Chairman read a paper on “Drilling and Manuring Crops,” of which the following is the substance :—

All farmers acknowledge the great increase of returns in using manure in wheat-growing; it is therefore of great moment to them that they use it in the most economical manner possible. The object of my paper is to dwell on this point, as there are three methods in which it is used at the present time—(1) Sowing it broadcast, (2) drilling it in with the wheat, (3) sowing it with damp wheat. While I was passing a few days at Neuarpar, about seven miles on the Victorian side of Frances, I came across some farmers who were of the progressive type, a type much wanted in many parts of Australia. From them I received valuable information about the advantages of manuring the land for wheat-growing, which will be of interest to the members of our Branch, more especially as the Neuarpar district contains land very similar to the Tatiara.

Mr. O'Callaghan stated :—“I have been farming here for sixteen years, and during this time averaged about 4bush. of wheat to the acre, a very good crop bringing in about 7bush. About eight years ago I used Naracoorte Cave guano, shaking it over the growing crop in September, and my crop yielded 16bush. to the acre. The year before was a very good one, yet I only obtained 4bush. per acre. I did not again manure that land for three years, and my succeeding crops were 12bush., 12bush., and 10bush. The following year I harrowed the manure in, but did not get a good crop; so next year shook it over the crop as before, and again got 16bush. to the acre. The year before last I reaped a little over 12bush., and last year I again manured with the same, and got 16bush., although it was a very dry season. This year I pickled the wheat in bluestone solution, and then mixed it with Thomas phosphate powder when it was damp, and sowed it at once, as if it dries it blows off the wheat. I find that this wheat began to grow a week before wheat not treated, and is very forward and strong. Sowing it damp with the wheat protects the latter from the birds, as they do not seem to find it. I use 30lbs. of phosphate to the bushel, whilst my neighbour has used 25lb. and 14lbs., but we cannot yet see any difference in their growth. The land is crabhole, bullock country, of fair quality. Land requires following every fourth year.”

Mr. J. McCarthy has stated :—“I have been farming here about sixteen years. Before I began to manure I got about two bags to the acre, and have cropped from 100 to 250 acres a year. About eight years ago I began to manure my crops, using Naracoorte Cave guano, shaking it broadcast, sowing wheat and manure together. I had a return of six bags to the acre. I left part of a paddock unmanured, and it only yielded one bag to the acre. So long as I could get this manure I had the same return from my land, four, five, and six bags to the acre. Last year I tried Adelaide bonedust, and got three bags to the acre; whilst I got two bags only where I did not use it. Thomas phosphate is making great progress here, and so far it seems equal to the guano or bonedust. It starts the grain two weeks before wheat not manured. I use 2cwt. to 4½bush. of wheat. My experience during the past eight years is that manuring the crops increases them at least 50 per cent. Last year was a bad one, and yet I received one bag per acre more from the manured than from the unmanured land. The grain grown from manured land is simply perfect. Every third or fourth year at the least the farmer should procure fresh grain, or even every second year if he can. It should have been grown in another district. I have had seed from Mount Gambier and Adelaide, and they were far better than seed grown in the district for changing. I have tried harley, but it did not do well: whilst Algerian oats brought in about five bags to the acre, or 1½ tons of green feed.”

Mr. O'Callaghan said that one ton of Thomas phosphate is enough for 100 acres of land. Sowing it damp with the wheat is the most economical way that it can be used, as when it is sown broadcast a very little wind will blow it away.

Mr. Chittleborough stated :—“I have been farming twenty-two years in Neuarpar, averaging about 100 acres a year in wheat. Before I used manure my land returned two bags per acre for a time, but latterly was reduced to one bag. I then used 3cwt. of Naracoorte Cave guano, and got a return of 18bush. per acre. I then tried 2cwt., and received 12bush. This last four years I used 1cwt. mixed wet with the wheat, and got a return of 12bush., and continue to do so. Last year my returns were 12bush. of wheat and 26bush. of Algerian oats, and over 1½ tons of hay per acre. This year I am trying five different kinds of manure—(1) 1cwt. Naracoorte Cave manure per acre, (2) 2cwt. Adelaide bonedust, (3) 56lb. Thomas phosphates, (4) 1cwt. Kangaroo Island guano, (5) 30lb. Marmar Island (Cape) guano per acre. I have sown all this in one paddock abreast of each other, the same day, so as to find out which is the best. My neighbors who did not use manure received one bag per acre, and less than half a ton of hay, on adjoining paddocks to which

I manured, the land being ironstone gravel, rising ground, boxwood and bullock. I prefer sowing the manure damp with the wheat, as you require only half the quantity. I have been using the same ground every year for seven years, and get good returns. I find that by putting in 100 acres manured is better than 250 acres unmanured. Mr. W. Holmes has used 20lb. Thomas phosphate per acre and Mr. G. Holmes 28lb., and I used 56lb. this year. Mr. F. Holmes is trying phosphate of lime, one bag to three acres. He says it burnt the wheat and burnt holes in the bags, and he will not try it again, as very little of the wheat has come up. Algerian oats are the best for this district. Wheat requires to be changed every two years. Mr. G. Holmes used  $1\frac{1}{2}$  cwt. Naracoorte Cave guano and got 16bush., and only 4bush. where he used no manure. My crop now looks splendid; better than last year. I finished sowing May 20th. Last year what I put in the first week of May gave me one bag more of wheat to the acre than that sown during the last week. You must sow early in May in this district, April is too early."

Members thought the method of mixing the seed and manure together before sowing would prove beneficial where the farmer could not afford to purchase or hire a seed and manure drill. The next meeting will be held at the farm of Messrs. Milne Bros., for the purpose of inspecting crops put in with the drill, and manured with different manures.

**SAND IN HORSES**—The Chairman said Mr. O'Callaghan recommended the following cure for sand in horses:—Flour boiled thoroughly as thick so that it can pour out of a bottle. Give as much as you can with a bottle. The next day give three packets of Epsom salts, and then plenty of bran in chaff for three days. Horses pass nearly pure sand afterwards. He had previously tried oil, yeast, and beer, without success.

### Minlaton, September 18.

**Present**—Messrs. J. Martin (Chairman), A. McKenzie, M. Twartz, H. Boundy, J. H. Ford, J. Bennett, W. Correll, J. McKenzie, D. G. Teichmann, John Anderson, S. Vanstone, J. Fletcher, R. Higgins, and J. Correll (Hon. Sec.).

**CONFERENCE**.—It was decided to postpone the proposed conference of Yorke's Peninsula Branches until about the third week in October.

**CROPS**.—Members reported the early sown crops as not likely to give a good return, while those later sown looked very healthy, and with good rains later on would yield well. The Hon. Secretary said this bore out what he had been insisting on for several years past, viz., that the land should not be ploughed until moist enough to break up well; and in answer to an objection on the score of horse feed, &c., said, "Where there is a will there is a way."

**RAINFALL**.—Mr. Higgins reported rainfall to date, 9·750in. For August, 3·000in.; for September, 0·860in.

### Redhill, September 14.

**Present**—Messrs. F. Wheaton (Chairman), S. H. Treloar, A. Hill, R. Siviour, A. P. Brown, D. Steele, D. Lithgow, and T. McDonald (Hon. Sec.).

**PRESERVATION OF FODDER**.—The Chairman read a paper on this subject, of which the following is the substance:

With a little trouble much might be done to provide supplies of fodders for stock in dry seasons. On the rich flats where the grass is rank it should be heavily stocked until about the end of August, to prevent it laying and wasting. Then the stock should be taken off and the herbage allowed to grow, as it then gets a better hold of the soil, is not so coarse, and in the winter provides shelter for the young grass. When a bad season occurs it is of course impossible to save this dry feed, but efforts should be made not to have the paddocks fed quite bare. In good seasons cut as much of the self-sown crop as possible for hay. He did not advocate ensilage, as there was so much heavy work, and it was more suitable for dairy cows than for general use. The crop should be cut as soon as most of it is in flower, as it is more nutritious than if left later, and it also packs closer in

the stack, so that the mice do not damage it so much as when the hay contains ripe seeds. Wild oats should be cut as soon as a few white patches begin to show in the crop, even if some of it is not out in head. Use the binder if possible, as if well stooked it will keep in good condition for a considerable time in the field. Cart and stack as soon as it is dry enough. This cannot always be done, however, when there is a large quantity of hay to be got in, and it must then be left in the field until after harvest. Make the stacks as high as convenient, so as to have as small a proportion as possible exposed to the weather. It will save time and expense if a suitable place for the stack can be found in the paddock where the crop is growing. Plough round the stack as a security against fire, fence it securely, and thatch well, and it will remain in good condition for a long time. Keep the ploughed land clear of grass, ploughing it up again each spring if necessary. Canary grass, wild oats, clover, geranium, and barley grass all make good hay if cut at the right time. As soon as the wheat crop is ripe enough, cut sufficient with the binder to make a large stack; put it up in large stooks where it can be left until the stripping and cleaning is finished. This should be headed close to where the stack is to be built, to save extra trouble. If any part of the crop becomes blighted, or shows much flag, this should be cut for hay. The cocky chaff should be put in a heap and carefully covered with straw, loose or in sheaves. For ordinary winter use it is a good plan to make a heap where the stock can be let to run when the cold weather comes on, putting a thin wall of loose straw all round and a good covering on top, and let the animals help themselves. When feed is scarce this chaff should be fed in boxes or carted out and placed in small heaps in the paddock, as with the large heaps a considerable quantity is wasted. When hay becomes scarce it should be chaffed and mixed with chaffed straw, or cocky chaff, and some richer food. Generally the best food to add will be wheat, boiled or crushed. The former is perhaps better, but it is more troublesome, and must be used soon after boiling or it will go sour. Where food has to be purchased the price will be the main consideration. Oats, bran, pollard, maize, molasses, and molasses meal are all useful. Stock have to get used to the latter before they will take readily to it. Then every farmer who has not got useful trees growing on his farm should plant some, as the trimmings of many trees are very valuable in seasons of drought. The sheoak is one of the most useful, while some kinds of mallee are readily eaten by stock. The sugargum grows readily here, and a large quantity of leaves can be obtained from them in bad seasons.

Mr. Treloar thought it better to stack at once and head it afterwards. Mr. Lithgow said wild oats were bitter if cut too early. Mr. Steele found barley-grass troublesome to cut early enough to be much good.

### Dawson, September 11.

Present—Messrs. R. Renton (Chairman), C. W. Dowden, A. G. Kennedy, C. H. Meyers, A. H. Warner, A. F. Dempsey (Hon. Sec.), and two visitors.

**PICKLING SEED WHEAT.**—Members considered bluestone pickle, 4ozs. to 8ozs. to the bag of wheat the best, and although wheat thus pickled took longer to germinate than unpickled seed, they had no proof that it was in any way injured, even if stored for a few weeks before sowing. Mr. Warner said he had twice tried sowing wheat which had been pickled twelve months previously. The first trial was a complete failure, and the second a partial failure. Members stated that several farmers had to strip their wheat last year before the grain was quite ripe, in order to save it from the rabbits, and they find that a large percentage of this fails to germinate.

**CABBAGES.**—Mr. Meyers said he found the London Market cabbage the best all-round variety for this district. Sweinfurth was a good early variety, and, in good seasons, produced large well-blanching heads.

### Inkerman, September 20.

#### *Inaugural Meeting.*

Present—Messrs. S. Diprose, E. M. Hewett, D. Fraser, W. Board, C. H. Daniel, J. Sampson, W. Fraser, S. Wills, and W. A. Hewett.

**BUSINESS.**—A considerable amount of formal business was dealt with

**MARRAM GRASS.**—It was decided to make inquiries as to cost, &c., of roots of Marram grass for planting on the drift sands at Port Wakefield. [Seeds of Marram grass can be purchased in Adelaide at 2s. per lb., and could be sown in nursery bed of loose sand about end of April. Plants would be ready for setting out following year in May, and would require three years to allow of division of roots for replanting. Roots can be purchased from T. Avery, Park Ranges, Port Fairy, Victoria, at £1 per ton. Freight, &c., will raise price to about £2 10s. per ton. One ton roots will plant nearly an acre. Roots should be planted in May, in rows 3ft. x 2ft. apart.—GEN. SEC.]

### Port Lincoln, September 17.

**Present**—Messrs. S. Valentine (Chairman), J. D. Bruce, E. Chapman, K. S. Browne, R. Puckridge, J. Telfer, G. Dorward, W. Laidlaw, and J. Anderson (Hon. Sec.).

**OFFICERS.**—Mr. Valentine was elected Chairman, and Mr. J. Anderson was re-elected Hon. Secretary for ensuing year.

**SHEEP.**—Mr. Browne read the following paper on “Sheep Farming on Coasty Country” :—

Those remarks apply more especially to the rough coasty country, of which the bulk of the district of Flinders is composed, and for which the Merino sheep is undoubtedly the most suitable, as it stands more hardship, and requires less feed to keep it in condition than any other breed. They also travel better than the heavier breeds, which is a consideration in coasty country, where sheep are being continually shifted from one part to the other to keep them in good health; in addition to which, there being no outlet for fat stock in this district, it only pays to grow sheep for the wool. I do not think coast disease is more prevalent in any part of the colony than it is in this west coast, and so far the only effectual cure that has been found for it is to change the sheep for a few weeks on to what is commonly known as heath country. There is no doubt that the coast disease is caused chiefly through a want of iron in the soil, as is proved by feed growing on ironstone country being the only cure for it. Several people have tried administering sulphate of iron to the stock, by putting it in the tanks and troughs, but it is not a success in preventing the disease, which goes to show that there is something besides iron required. As a rule coast disease is worst in a good season, when the feed is rank.

As sheep are always inclined to deteriorate, too much attention cannot be paid to culling out inferior animals, and only breeding from the best obtainable, as whether a man owns one or ten thousand sheep, he wants to make them as profitable as possible; and the margin between profit and loss has been so small during the last few years that the slightest thing will turn the scales one way or the other. In selecting rams to breed from, take notice of the points your sheep are deficient in, and select rams which are strong in those points. The class of wool which has realised the best prices the last few years is a long, strong staple, not too fine; and if you can get sheep with that class of wool, combined with density, they will be the most profitable for wool growing. If you hire rams do not get inferior animals on account of their being a few shillings cheaper, but get the best that can be obtained, as the progeny will soon make up for the extra outlay, and a good animal eats no more feed than a bad one. Get a change of blood every few years if possible, as it helps to keep the constitution strong. It does not pay to breed many more sheep in this district than you require for your own use, as in ordinary seasons there is very little profit to be made out of travelling sheep to a distant market. The local demand is next to nothing. No doubt in the present season it would pay anyone who has any surplus stock to send them overland, as there will probably be a good demand on account of the heavy losses that have occurred in other parts, and every prospect of a good season up North.

Early lambing is generally the best for several reasons, as in the average of the seasons there is generally green pickings to be got in May, and the lambs have a chance to get some strength in them before the cold weather sets in; and in the country away from the coast the frost is often very severe during the winter, and destroys numbers of the lambs which are dropped on a frosty night; and on the coast there is very often a cold, bleak wind blowing, accompanied with rain, which has the same effect on them. You get more wool at shearing time off early lambs, and they are fit to wean before the feed gets too dry. They also stand travelling better. Always have plenty of rams amongst your ewes, to

ensure having the lambs dropped about the same time, as where the lambs have to be shifted on to the heath country, it makes a great difference in travelling a mob of ewes and lambs if the lambs are all about the same age. A few young lambs in a mob often means an extra day's travelling to get from a coastly to a healthy paddock, and another night in the yard, which often causes the loss of a good many lambs, especially if the weather happens to come up rough and wet.

Lambs generally have to be shifted off coastly country when from six weeks to two months old. As soon as a lamb begins to feed it is liable to get coastly, and if not shifted as soon as the disease shows, numbers die. Never shift too many ewes and lambs in one mob; about seven or eight hundred is sufficient if you have to yard them more than one night. It is a job to mother a large mob of lambs after they are knocked up with travelling for a day or two, and the ewes being hungry are more inclined to desert them. In yarding give them plenty of space, so that the lambs will have a chance to find their mothers, and the sheep will have room to camp. A mob of sheep crowded into a yard for any length of time are apt to sweat, the wool gets loosened, and a lot of it comes off, especially if they are turned into a scrub paddock. When practicable do not tail the lambs until after they have had a change on to the heath, as there will be less mortality amongst them. Lambs always fall off in condition on heath country, and the ewes have less milk, and by tailing lambs on to grass country they have a better chance to recover.

Do not keep any old sheep on a place, as they are unprofitable stock. As soon as they begin to get broken mouthed, cull them out, and fatten them for rations if you have available paddocks; or get rid of them at any price, as they only eat the feed that would keep younger sheep, and very probably the bulk of the old sheep die before the ensuing shearing, and you lose both the sheep and the wool. One young sheep will cut more wool than three or four old crawlers, and if you are mustering or travelling sheep, a few old ones will often keep the whole mob back, and the strong sheep have to be knocked about by continually stopping them, so that the old ones can keep up with the flock. When lambs are taken away from their mothers to wean, always put a few old sheep into the paddock with them, as it prevents them hanging about the fence much, trying to make back to the ewes, and the old sheep take them to the watering-places, where there are only one or two watering-places in a large paddock. The weaners will want mustering to the water about every other day for the first week, or until they take to going to the water of their own accord. Sheep put into a new paddock in the summer time generally require to be mustered to the water a few times. Have the watering-places as near the centre of a paddock as possible, so that the sheep can reach them from all parts without having to travel too far, and always see that the troughs or waterholes are kept clean, as dirt very soon collects in a trough where there are many sheep watering at it, and sheep, like horses, are very particular, and will often hang about for hours without taking a proper drink, and then go away half satisfied. Well water is far superior to open waterholes, as it is always cool and clean. It is a job to keep an open waterhole clean where the sheep are continually puddling it, and now and again a weak sheep dies in the water, and may be in some time before it is noticed. The more watering-places there are in a paddock the better. About three miles is far enough for any sheep to travel, as they generally feed away from the water until they want a drink, and in cool weather will sometimes get a long distance from the water before they feel thirsty.

It is a mistake to crowd too many sheep at one time into one paddock when the feed is plentiful, as they trample down and destroy a lot; put in a fair number, and when they want a change there is feed left for another lot to take their place.

Do not muster or draft sheep in cold rough weather if it can be avoided, and do not hand-draft sheep more than is necessary, as it knocks them about a lot, however carefully they are handled. Never catch a sheep by the wool. Have the drafting yards constructed so that the sheep can see through the fences from one yard into another, as they are less trouble to draft when they can see the sheep in an adjoining yard. Solid stone walls are not suitable for drafting yards.

Keep the fences in good order, so that you know where to find your sheep when they are required. A day or two's work repairing the fences will often save pounds worth of sheep, as very often sheep that are coastly get into another man's paddock amongst healthy sheep, which may not be mustered for some time, and in the meantime the coastly sheep die from want of a change; also, if the wild dogs happen to rush a mob of sheep against a fence which is in bad repair a number of sheep will get through.

Change the sheep on to the heath country as soon as they show any sign of coast, as if they once get the disease it takes some time to cure them, and it throws them back a lot, besides stopping the growth of the wool, which starts a second growth, and the result is a broken staple at shearing time. The same rule applies to heath country where there are nothing but bushes for the sheep to eat. Sheep will do well on good heath country from about August to the end of November in an average season, when the bushes are shooting

and out in flower. As a rule, at any other time of the year the heath is only good for a change for a month or so, and in summer time sheep generally fall away, unless it has been burnt the previous year, when there is a lot of young herbage to be had.

As a rule it is best to shear before the feed gets too dry, as it gives the sheep a chance to pick up before the hot weather sets in. When shearing be careful to skirt and class the wool properly. Wool rolling and classing is one of the chief things in a shed. A few badly-rolled fleeces, not properly skirted, with dirt in the fleece, will condemn a whole bale. It is not desirable to have too many classes of wool in a clip, as the more bales there are of a certain class of wool the better the price realised. Do not put too many fleeces in one bale, about 400lbs. is weight enough to put in a bale.

Dipping sheep is comparatively a new departure in this district, and it is a question whether the cost of dipping is gained in the extra quality of the wool. No doubt the sheep thrive better and grow more wool through being free from tick and other vermin, but these are not bad in most parts of the district. It is not a good plan to dip in cold weather or late in the day as, if a cold night follows, numbers of the sheep die. The sheep are all the better turned into a paddock for a few days after coming out of the shed before being dipped, as they have a chance to recover the knocking about they get in the shed, especially where they have to travel a day or two before being shorn.

**FEED FOR STOCK.**—Mr. Valentine said he found that his cows which fed on the young sheaoks, which he had to cut down when clearing, gave an increased flow of milk, and improved in condition. He considered it a splendid food for cows. Mr. R. Puckridge said this improvement was only temporary; both cows and sheep soon fell off again, and many of the latter had died from the effects of this food. He thought there was very little nourishment in these sheaok droppings, and believed if all these trees were cleared off their place would soon be occupied by grass, and the country would carry more sheep and the wool would be of better quality. Mr. Laidlaw found sheep just taken off grass did not take readily to sheaok. Most of the members pointed out that although stock could not be expected to thrive on this plant alone for any length of time, it was of the greatest value in summer, when there was very little herbage on the stony rises; and without sheaok much of the country would be almost valueless. During the past season it has simply been a question between sheaok and starvation for stock, and all the members, except Mr. Puckridge, agreed that this plant was very valuable for fodder in this district.

**BRANCH SHOW.**—A committee was appointed to make necessary arrangements for the annual show of the products of the district, to be held in connection with the Branch, on the first Wednesday in March.

### **Bute, September 11.**

Present—Messrs. A. Schroeter (Chairman), H. Schroeter, R. Commons, W. Langsford, W. H. Sharman, E. Ebsary, M. Stevens, J. Birch, J. J. Chapman, W. Sluggett, D. Green (Hon. Sec.), and one visitor.

**FIELD TRIALS.**—Considerable business in connection with the recent and forthcoming field trials of agricultural implements was dealt with.

**RAINFALL.**—Recorded for August, 2·765in.

### **Pine Forest, September 14.**

Present—Messrs. J. St. J. Mudge, (Chairman), W. Burgess, J. Flowers, A. Mudge, G. Zilm, and R. Barr, jun. (Hon. Sec.).

**FOREST TREES.**—The Hon. Secretary reported that he had obtained 600 trees from the Forest Department and distributed them to the residents.

**DAIRYING.**—The Chairman thought they should endeavor to secure one of the Jersey bulls obtained by the Government, as there was plenty of room for



improvement in the dairy cattle of the district. Several members agreed as to the necessity of doing something in this direction, and it was decided to apply to the Government for the use of a bull.

**ROLLING WHEAT.**—The Chairman asked for an expression of opinion concerning rolling wheat. Mr. Flowers considered it a risky proceeding, considering the present conditions of the crop and weather. If rain followed soon, the crop would be benefited: but, if dry warm weather set in, as it has done in September during the past two years, the plants would be injured. Mr. Zilm agreed; he had noticed that where some horses had been rolling about on his crop the plant had withered and died. The Hon. Secretary had never noticed any ill effects from rolling, and would not be afraid to roll if the ground were lumpy, and required levelling. The operation might not benefit the crop if performed in dry weather, but it would not harm it, while if rain followed any time before the grain ripened, it would do good. On a vote being taken the majority were against recommending the practice under present conditions.

**RAINFALL.**—For September, to date, 0·610in.

### **Cherry Gardens, September 14.**

**Present**—Messrs. J. Potter (Chairman), T. Jacobs, C. Lewis, J. Lewis, J. Mackereth, J. Choate, E. Wright, G. Hicks, J. Richards, W. Nichollie, R. Gibbins, C. Ricks (Hon. Sec.), J. Wright, A. L. Morphett, A. Harper, and W. Spencer (Clarendon Branch), A. Murray, and G. R. Laffer (Belair Branch), and three visitors.

**BRANCH CONFERENCE.**—It was decided to hold the annual conference of the Hills Branches at Cherry Gardens on October 19th.

**GRASS PEST.**—Messrs. J. Potter and C. Lewis tabled specimens of “grubs” destroying the grass and moss in the district. They burrow just under the surface of the soil; they are also reputed to attack tomato plants. One gentleman destroyed them all by laying a mixture of Paris green, bran, and sugar.

### **Crystal Brook, September 8.**

**Present**—Messrs. W. J. Venning (Chairman), W. Hamlyn, J. C. Symons, R. Pavy, J. Chambers, J. Forgon, G. Davidson, W. Natt, E. Pope, and George Miell (Hon. Sec.).

**FIELD TRIAL.**—Delegates from Crystal Brook, Narridy, Port Pirie, and Gladstone Branches, met to draw up rules for the Crystal Brook Field Trial Society.

**MANURES.**—Members and visitors inspected the crops on the chairman's farm, which were put in with the seed and manure drills at the field trials held some months previously. Different manures were used, some up to the present appearing to have a more beneficial action, and generally the crops drilled in with manures are much ahead of those put in with the drill but without manure, and these latter are 10in. to 12in. higher than those sown broadcast without manure.

### **Carrieton, September 23.**

**Present**—Messrs. W. J. Gleeson (Chairman), R. Fuller, sen., A. Steinke, W. Steinke, J. McNamara, H. Menz, F. Kaerger, and J. W. Bock (Hon. Sec.).

**PAPER.**—Mr. McNamara read the following paper on “Utilising Storm Waters” :—

In the drought-stricken districts of the North, it will be found that with a little trouble in directing the storm waters, which go to waste in the creeks, a great saving of stock would result. In many places it would be very easy to change the course of shallow creeks and gullies, so that the water may be made to flow on to low-lying flats. With a little trouble in levelling such flats the water may be made to spread over a few acres, and lucern or other fodders grown to advantage, besides a plentiful supply of vegetables nearly all the year round, thus making the cost of living expenses fully 50 per cent. less. In the season of 1896, one of the driest experienced, I had vegetables right through the summer. I find that tomatoes and all kind of melons grow splendidly, and if the ground can be flooded once in the year it will stand a prolonged drought, and almost anything may be grown if the land is kept free from weeds and loose on surface, which may be done easily after flooding. All vegetables should be grown in rows, so as to admit of the hoe being used, which will be found of the utmost benefit to the land in taking in moisture and retaining it. Last year, notwithstanding the excessive dryness, I sold ten cases of tomatoes off my little garden, and am confident it would pay better to have a quarter of an acre of garden well worked and attended to, than to put in several acres and neglect to work the soil. A long discussion followed on the raising of seeds and the cultivation of the soil.

**EXHIBITS.**—Mr. Fuller tabled dried peaches and raisins of good quality. Mr. Kaerger tabled seed of the “Native Carob, or Dead Finish,” which grows naturally in the Far North, and is much liked by stock. Several members intend to sow seeds for trial.

### Benmark, September 17.

**Present**—Messrs. F. S. Wyllie (Chairman), W. H. Harrison, A. L. Atason, E. Taylor, and W. H. Waters (Hon. Sec.).

**PAPER.**—Mr. Harrison read the following paper on “Gypsum in its Relation to Agriculture” :—

The value of gypsum in agriculture is more or less recognised throughout the civilised world, but in arid climates it is almost an essential of intense culture. The large natural deposits of this mineral consist of almost pure sulphate of calcium (better known as sulphate of lime), and although, like other lime compounds, its fertilising effects are indirect, it is none the less a true and valuable manure.

Again, like some other lime compounds, it has important mechanical effects which greatly facilitate cultivation. In most arid districts alkali, particularly carbonate of soda, accumulates at the surface and, with clay, forms a hard glazed coating which is almost impervious to water. A slight dressing of gypsum makes what was like creamlaid paper resemble blotting paper.

The chemical action of gypsum may be said to be fourfold—(1) It converts carbonate of soda into sulphate of soda (Glauber's salts), a perfectly harmless compound, and carbonate of lime (chalk), which has an important mechanical action on stiff lands. (2) It converts carbonate of potash into sulphate of potash (a most valuable manure) and carbonate of lime. (3) Carbonate of ammonia, which is volatile, by the action of gypsum is converted into sulphate of ammonia, which is not volatile, and is a still more valuable manure. (4) Gypsum applied to a manure heap prevents the ammonia as it is formed by decomposition from being dissipated in the air. If the drainings from the stable be conducted into a tank containing gypsum a large quantity of sulphate of ammonia may be readily formed, the market price of which is from 16s. to 17s. per cwt.

### Quorn, September 22.

**Present**—Messrs. J. B. Rowe (Chairman), Jas. Cook, F. Herd, G. Altmann, R. Thompson, and A. F. Noll (Hon. Sec.).

**MEETINGS.**—The Chairman explained that owing to the necessity for removing their stock from the district for feed, it had not been possible to hold meetings during the past few months.

**SALTBUSHES.**—The Hon. Secretary tabled seeds of perennial saltbushes collected by himself while away with stock. Members took some for trial, and anyone desiring a few seeds can obtain same on application to the Hon. Secretary.

**ANNUAL REPORT.**—The Hon. Secretary's annual report showed that during past year six meetings were held, with an average attendance of six members. Several papers were read and discussed. A conference of Northern Branches at Carrieton was attended by members. The Chairman and Hon. Secretary were re-elected for ensuing year.

**SEED EXPERIMENTS.**—Mr. Altmann tabled three large squashes, including Mammoth Chili, and reported favorably of the following plants raised from Bureau seed:—Fordhook 'First tomato, Giant Pera cucumber, Long Island Beauty and Grand Rapids sweetmelons, and Mammoth Ironclad and McIvor sugarmelons.

### Strathalbyn, September 20.

Present—Messrs. M. Rankine (Chairman), W. M. Rankine, A. Rankine, W. J. Tucker, R. Watt, and J. Cheriton (Hon. Sec.).

**MANURES.**—Several members reported on results of manures used by them, some being favorable, and others not so. Mr. W. M. Rankine said he could see no improvement in his crop, though some of it had been drilled in with 2cwt. of phosphate per acre.

**PAPER.**—The Chairman read the following paper on "Hay, and When it Should be Cut":—

I have been induced to take up this subject for a paper to be read and discussed at this meeting from the fact that in answer to an inquiry from one of the branches as to when oats should be cut for hay, the information given by the General Secretary was as follows:—"Oats should be cut green for hay, the best time being when the tips begin to turn color." My experience is, if meant for long hay, it is about correct, but if intended to be cut into chaff (for the greater bulk of hay is now cut with that view) it is decidedly too early, both for profit to the grower and usefulness to the consumer, viz., the horse. Perhaps it may not be out of place in this paper, when dealing with one kind of cereal that is largely grown for hay, to refer to other varieties, and when they should be harvested.

**Wheat.**—I shall deal with wheat first, as I believe more hay is made from this cereal than any other kind, from the fact that many crops when sown were intended for the stripper but were found to be too dirty after coming into ear, and consequently had to be cut for hay, so as to make the most of the crop. I have already inferred that the most of the hay that is now cut goes through the chaffcutter; and with that view, I will now state my experience, and that experience has extended over a good many years in supplying large buyers, such as Hill & Co., and others. I prefer cutting wheaten hay after the grain has formed in the ear and the straw turning color; I consider that if the crop is cut just when the bloom is off the chaff is much too sappy, and has the effect of making the horse soft, and what is worse, scour. I am aware that scientific writers on agriculture have stated that hay if cut when the bloom falls is at its best. That may be so if you want to put on flesh, but for a horse that has to work hard or travel fast, I consider if cut at that period to be very objectionable. Theory is good, but practice is better. I have always found my horses to keep their condition and do their work well when fed on chaff that had but little color but a good deal of grain in it, and I rarely give bran or pollard. There is also another advantage, and not a small one, that when the straw has hardened it will dry quicker, not be so easily affected by damp weather, and sooner in a fit condition to go into the stack. As I have already stated that much of the wheaten hay that is cut was found too dirty for a grain crop, with wild oats, which farmers have most to contend with, they are generally ripe before the wheat plant is ready to cut, and take away, to a certain extent, the bad effect of the green soft wheat straw. I was told on one occasion by Hill & Co.'s inspector of hay, that they preferred mixed to pure wheaten hay.

**Cape Oats.**—I consider Cape oats hay superior to all other kinds, especially for saddle and harness horses. I never think of cutting this kind of hay until the green shade has left the straw; there will then be plenty of sap in it and a half-filled sample of oats. A

sample of chaff taken from hay cut under these conditions would compare badly, as far as appearance goes, with that of a pure wheaten hay sample cut in a good condition. Chaff must not be judged solely by appearance. I remember being told by a chaff merchant, to whom I had sold a quantity of oaten hay chaff, that one of his customers strongly objected to it owing to its color. The merchant wrote back asking him to examine it again, and also learn what his horse had to say in the matter; and the result was that he wrote asking to send some more of the same kind. In support of my contention that hay should be cut under more matured conditions than people think, we have to obtain not only the opinion of the horse owners, but of the horse itself and how it affects him. When food is placed before a horse the first thing he does is to smell it, and if that and the taste are to his liking, he at once proceeds to satisfy his hunger. One of the first things a buyer does when a sample is submitted to him for sale is to smell it, and, if he is a good judge, will at once detect if the chaff is sound or otherwise, and in many instances know if inferior mixtures have been cut with it. Many people who have a horse, and have had little experience with chaff, think that if it is not a greenish color it must have been mixed with straw. One test of pure chaff is its weight according to its bulk. Properly matured hay is the most profitable for the farmer, best for the horse, and economical to the buyer. To give an instance how people are deceived by appearance, I, along with others, was examining some exhibits at a show, and the first prize exhibit looked well, was well cut, and of a green color, but when we tried the smell test it was enough to condemn it, as it was easily known that the exhibitor had damped the hay well before chaffing it, so that the sample might be well cut, and the consequence was that fermentation had set in and spoiled it for feeding purposes. If the judge had a nose he certainly made a poor use of it. I look upon quick fermentation as a good test of the quality of hay for feeding purposes generally, and for this reason I prefer the Cape oaten chaff.

*Algerian Oats.*—This is a comparatively new cereal for hay purposes which has come into favor of late. It was in answer to an inquiry as to when this particular kind of oat should be cut for hay that prompted me to write this paper. I have not cut many crops of this particular kind, for several reasons. I have found it rather late in coming into ear, and if we do not get good October rain it is apt to be a short crop, and as it has a peculiarity of making wonderful growth a week or two before coming into ear, it is therefore necessary that there should be sufficient moisture in the ground at this particular time. The principal objection to it is that when the crop is cut green the hay has a very bitter taste, hence the stock will refuse to eat it until compelled by hunger. I gained this knowledge not by experience, as I always allow the straw to change color before cutting it; but I am acquainted with several farmers who did not allow it to do so, but cut it in a green condition, and the consequence was their horses did very badly when fed on it. One of them in particular, who considered he was as good a judge of chaff as his horses, insisted on them eating it, but had to give way at last, as he did not like to see his teams going out in the mornings with empty stomachs. Why the horses refused to eat the apparently good chaff he could not understand, but afterwards found out, and is not likely to make the same mistake again in cutting the Algerian oats too green. I have therefore no hesitation in saying that this kind of oat should have quite lost its greenness, at least the bulk of the crop, before cutting it. These remarks refer more particularly to hay intended to be chaffed, but with regard to feeding of long hay, it should be cut in a much greener condition, otherwise there will be a waste.

*Barley.*—I have met with farmers who speak highly of barley hay. My opinion is that it is but little better, if any, than good clean wheaten straw.

There are many varieties of the above-named cereals from which hay is grown, but I have not thought it necessary to particularise them more in this paper than I have done, as my chief object in writing this was to combat the necessity of cutting hay crops in a green sappy condition.

## ITEMS ABOUT CO-OPERATION.

At the annual Congress of Co-operative Societies, held in Perth, Great Britain, in June last, the great and beneficent work being performed by these organisations was powerfully illustrated by the statistics brought forward. There are now 1,741 societies in Great Britain, with 1,492,371 members. Sales effected to value of £57,318,426: profits made, £6,337,490; investments made, £10,632,316. All this notwithstanding that the aims of the co-operations are to provide members and customers with the best class of goods at the lowest prices compatible with safe business principles: "Cash with goods, and no bad debts."

In France and Germany co-operation is very much more in evidence than in Great Britain, and in America the principle is recognised by many thousands of organisations.

The Adelaide Co-operative Society was established in 1868, and its first year's income was £150. Its income at present is about £90,000 per annum, with annual net profits of about £6,000, which are divided half-yearly on co-operative principles. The society employs 104 hands in its stores, bakery, boot factory, tailoring, and dairy, and pays wages weekly to the amount of £168. Since its inception £1,100,000 has been turned over in the business, and £78,200 has been distributed in interest and profits. All profits made belong to the members, no credit is given, and all goods are supplied of first quality at lowest prices consistent with safety. Customers are supplied with any article they may require, and if not in stock it will be procured. The stores and offices are at junction of Angas and Nelson streets, Adelaide, where all information concerning its methods of working will be supplied by the manager or secretary.

The South Australian Farmers' Co-operative Union, which was started at Jamestown some nine years ago with about fifty shareholders, holding not more than 1,500 £1 shares, has progressed very satisfactorily of late years, notwithstanding adverse circumstances. In 1893, after a little more than four years' work, the company had between 300 and 400 shareholders, with shares to the value of £3,000, and on this their turnover was nearly £90,000 for the year. Two years since the head office was removed to Adelaide, Mr. Clement Giles, M.P., being appointed manager. The present capital is £12,753, of which £7,900 is paid up, leaving a calling power of £4,800. In May, 1897, there were thirty-two agencies throughout the colony, and nearly 1,800 shareholders—nearly three times as many as there were twelve months previously. Branches will be established in districts on forty persons subscribing for a total of not less than 250 shares, upon which 5s. per share is to be paid. Calls are made as further capital is required. In 1896 the Union paid to its shareholders for 175,377 bags of wheat, £151,000; for 3,200 bales of wool, £22,000; for 20,533 bags of potatoes, £5,346; skins, oats, barley, and other produce brought the total for the year to over £180,000. The wool business was only taken up last year. This year there will be a slight increase in the quantity dealt with, but had the season been any way favorable it was expected to double the quantity. Last year the Union imported 100 tons of commercial fertilisers for shareholders, who were in consequence enabled to get it at nearly 10s. per ton less than they would have had to pay if they had purchased for themselves. This year 700 tons of manure have been ordered, and the manager has already received from the shareholders applications for the whole lot. Cornsacks and woolpacks are imported in large quantities, and here again the shareholders benefit to a considerable extent. Very little has been done with machinery, owing to the variety of makes, and the consequent heavy outlay in keeping the

parts for the different machines. This association deserves to be better supported by the producers. With the small capital its usefulness is greatly restricted. With a capital of £50,000, which there should be no difficulty in raising if the producers would study their own interests more, its sphere of usefulness would be greatly enlarged, and almost everything raised on the land could be sold by the Union, while all the requirements of the cultivators could be purchased at wholesale prices for them. As all profits are divided amongst the shareholders, they thus benefit in two ways.

The fruitgrowers of several localities in New Zealand have established highly successful co-operations, and control the markets with their produce. Instead of the dealers and packers fixing the prices, the growers themselves, through the managers of their own depôts, decide upon what shall be the sale prices of their produce. They also buy fertilisers, stores, implements, and other goods required, at wholesale prices, and retail them to members at a low profit. The rules by which members bind themselves to their co-operation are necessarily very stringent, but just, and they are enforced most strictly in every case. Copies of these rules, &c., are printed in Report of Proceedings of the Inter-colonial Fruitgrowers' Conference in New Zealand, and this report can be obtained for 1s. at the central office of the Agricultural Bureau in Adelaide.

In Great Britain the Glasgow Fleshers' Trade Protection Association has sent a manifesto to the Scottish farmers, asking them to pledge themselves not to deal with any co-operative society whatever. This will, of course, place the farmers on the horns of a dilemma. The co-operators offer many advantages to all who deal at their stores; but by dealing in live stock and undertaking the butchering business as well as in all other trade and commerce, they bring their union into competition with the individual fleshers or butchers who have formerly purchased the whole of the fat stock of the farmers. No doubt the co-operators can hold their own in the conflict, but it will be interesting to watch the war between individualism and co-operative effort.

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### NOTES AND COMMENTS.

The absence of sufficient rain during the past month over nearly the whole of the agricultural area northwards of Adelaide has had a deplorable effect upon grain and hay crops, which had previously given such bright prospects of a bountiful harvest. Until the returns come in it is impossible to tell the amount of damage done, but there is little doubt that the average of the colony has been decreased several bushels per acre. Wherever phosphatic manures have been applied the yields, however, will almost invariably be considerably heavier than where their use has been omitted; and in all cases where land has been ploughed late, and where crops have been sown on dry soils, the yields will be much less than where the land was ploughed earlier, and where seed has been sown on moist soils.

It is worth while to sow some maize or sorghum during November and even in December on land laid up in fallow. A few acres only will supply a large quantity of succulent food for stock, and will not depreciate the fertility of the soil for a crop of wheat next season. It would be well to soak the seed twenty-four hours, and then sow in drills an inch deep, 30in. apart, and 8in. to 10in. between the plants. Roll directly after sowing, and when the plants are up hoe with horse-hoe or hand-hoe to a depth of an inch or not above 2in. at once, and several times later on, so as to allow the air to get free access to the soil.

When farmers in drought-affected districts take to baling their straw and using the bales of straw as building blocks for barns, sheds, and walls of over-ground silos they will discover several advantages from the practice which will not at first be thought of. For instance, in putting in the silage they will build up the walls as the fodder comes in, and thus will save lifting it over a high wall. When the pressure is required it can be put on in the shape of pressed straw bales, which can be shifted on to the walls to accommodate further layers of silage. When the silage is wanted for feeding the stock a few of the bales can be lifted away from the walls, and this will save lifting the silage, as it can be shot into the trolley or cart by means of a chute. Bales of straw can be used at the bottom or floor of the silo, and will absorb the juices or liquids from the silage. Finally, the straw bales can be chaffed along with the silage and fed to the stock.

In many parts of this colony, as well as in the territories of our neighbors, livestock of every description suffer from "rickets," "redwater," "impaction of the omasum," "asthenic apoplexy," "mysterious disease," "coast disease," and various other diseases, most or all of which are brought on through the dry, hard, fibrous, indigestible, and innutritious nature of the herbage upon which they are compelled to exist. It is well worthy of notice that some owners of livestock have minimised their losses by cultivating fodder crops especially for their livestock; but even then there has been a lack of some constituent in the herbage so cultivated that is necessary to the health of the plant and of the animal living upon it. In "coasty" country some farmers have cultivated lucern, but found it useless as a remedy until they have applied sulphate of iron to their "hospital paddocks." On Yorke's Peninsula some farmers have noticed that sheep, horses, and cattle—especially cows—remain almost constantly on land that has been manured with phosphates, even though the feed elsewhere may be far more plentiful; and, acting upon the hint, they have mixed a little dissolved superphosphate in the drinking water with beneficial effect. There are objections to dosing livestock, except occasionally when they are sick; but if we can apply manures to our land which will cause a stronger and more healthy growth, and at the same time make the plants nutritious to our livestock, we shall benefit in every direction.

All generous-minded men will regret to learn that the supposed remedy for rinderpest in South Africa has turned out to be a comparative failure. It will be remembered by many that Dr. Koch had tried inoculation with bile from a diseased animal, and the result was that the inoculated cattle appeared to be proof against the rinderpest; but unfortunately this has proved to be only a temporary protection in most cases, and within periods of two months to twelve months the cattle become again liable to be attacked by the disease. Rinderpest is rapidly spreading over Cape Colony, and meat of all kinds is becoming very scarce indeed. Butchers are charging 1s. per pound for meat, and find much difficulty in getting beasts to kill. Colonists complain bitterly of the impost of 2d. per pound on all meat—Australian and other—imported, and are agitating for removal of the impost. Scientists are now experimenting with blood and serum injections, and entertain great expectations of success in rendering cattle immune against the rinderpest.

Surplus and culls of apples and pears may be utilised in various ways, and the manufactured product, if properly treated, should be worth as much as the first-grade fruit. But it will not pay to use any but sound ripe fruit—such that is not bruised or half-rotten. Everyone knows that fruit which has become "stale," or that which has been bruised, or is over-ripe, has lost the brisk savor and aroma which belongs to fruit properly ripe and fresh from the tree. Such fruit will never recover. Use the culls and surplus when quite fresh and brisk for evaporating, or jams, jellies, &c., or make vinegar for their expressed juice, or unfermented fruit juice, or cider, or perry. Fruit juices may be preserved, after being expressed, by keeping them at a temperature of 180° to 200° F. (not more or less) for fifteen minutes, then seal up in bottles at once, whilst at the higher temperature. It is said that apple or pear juice can be kept at any degree of sweetness by simply adding a pint of grated horseradish to a barrel of 36galls. whilst fermenting. This stops the fermentation. Others use a gill of mustard, and others about 3lbs. of well-burnt charcoal for the same purpose.



A great many agronomists are possessed with a mania for burning organic matter instead of composting it. In the flame and smoke they lose all the nitrogenous matter, which is by far the most important and valuable constituent in a fertiliser. Soluble nitrogen is twice the worth of any other ingredient; but this is all dispersed in the flame and smoke, and only 4 to 5 per cent. of ash is left, containing a little potash and phosphoric acid with a bulk of lime, sand, and other worthless rubbish. The thrifty cultivator will save every article that can be converted into manure and place it in a midden or pit, where it will decay in time. To prevent the escape of oxidised nitrogen, in the form of ammonia, he should sprinkle each layer of litter, &c., with a few handfuls of pulverised or calcined gypsum, or with dry soil.

Neither lime nor common pickling salt are manures within the strict meaning of the term; but in many instances the application of those substances to the land exercises a considerable beneficial influence upon the crops grown thereupon. This influence is attributed to the energy of these minerals acting upon other substances, separating and setting free for the use of plants such matters as phosphoric acid, ammonia, potash, &c. It is well recognised that common salt has also the property of absorbing moisture, which is then available for the plants; and quicklime, in addition to its power of breaking down clay soils, possesses an irresistible tendency to abstract carbon from the air, producing carbonate of lime. Is it not possible that this carbon becomes available for plants also? At any rate, the moderate application of lime and of salt under certain circumstances is favorable both to a good mechanical condition of the soil and to the health and vigor of the plants grown thereon.

The eel-worm, which forms root-galls on oats and other cereals, and supposed to be or closely allied to *Tylenchus radicola*, has found its way to Tasmania, and is described by Mr. L. Rodway, Tasmanian Government Hon. Botanist. The same or a similar nematode has been found near Penola, in South Australia, and was described by Dr. A. Cobb in the *N.S.W. Agricultural Gazette* in August last year. It is unfortunate that this pest attacks the roots of rye grass, and probably several other cereals, which makes it necessary to resort to root crops and legumes for several seasons in order to starve out the enemy. It is probable that this eel-worm is transported from place to place with the implements of cultivation, in the soil on the feet of animals, and possibly the eggs may be carried with seed.

Experiments have been made in planting strawberries at the Central Station, Ottawa, Canada. The first experiment was made by making a hole in the well-prepared bed, taking the plant in the left hand, spreading the roots very carefully in all directions, then sprinkling in fine soil, and finally pressing the soil down firmly. This is the method generally employed. The next method was to set the plants in a cleft made with a spade, which was set across the row, spreading the roots fan-shape as much as possible, and the earth well packed about them. A perfect stand of plants was obtained from both methods, and no difference in the health and vigor of the plants in either case was observed. The latter plan is the more expeditious, and therefore economical, and is worth trying in putting in other plants. In strawberry-growing it is necessary to keep down weeds, and to maintain a loose condition of the surface soil from first to last.

In Victoria arrangements have been made by the Vegetation Diseases Board to have an inspection of all nurseries to see that they are free from disease. It is felt that nurseries are the first places where diseases of plants should first be combated. In New South Wales in some parts the San Jose scale—the most pernicious known—has become a terrible pest, and its introduction in every case has been traced to one nursery from which infected plants had been purchased. The owner of that nursery has consented to destroy all affected plants. In some parts of California the law prohibits the distribution of diseased plants or fruit. It is evident that it would be hopeless to attempt to stamp out diseases of plants whilst nurserymen and others are allowed to distribute diseased plants throughout the whole breadth of the land.

## NOXIOUS WEEDS.

**CANADA THISTLE** (*CNICUS ARVENSIS*).—This plant is known in England as the "Meadow Thistle," "Corn Thistle," and "Green Thistle." In America and Canada it is called "Canada Thistle" and "Cursed Thistle." In Australia it is known as "Canada Thistle." Wherever it gets a hold it is truly a curse upon the owner of the land. Its roots ramify in every

[The following illustration is from nature, the block kindly loaned by the Department of Agriculture, New Zealand.]



CANADA THISTLE (*CNICUS ARVENSIS*).

Fig. 1.—Flower and seed-heads. Fig. 2.—Leaf (separated). Fig. 3.—Root, showing creeping habit and the manner in which stems are produced at short intervals. All greatly reduced.

direction, from near the surface and deeply down, and at very short intervals they send up stems, so that the whole field becomes matted with the leaves and stems, which are thickly covered with short, sharp thorns. Large areas of land in New Zealand, Tasmania, and Victoria are dominated by this weed, and everywhere it is most difficult to exterminate. It grows from 2ft. to 5ft. high, according to the soil and climate. The leaves are from 4in. to 6in. long, winged at the base, deeply lobed, the edges armed with numerous

[The following illustration from nature has been kindly loaned by the New Zealand Department of Agriculture.]



BATHURST BUR (*XANTHIUM SPINOSUM*).

Fig. 1.—End of a branch. Fig. 2.—Leaf. Fig. 3.—Bur, showing hooked prickles. All of natural size.

short, sharp, stiff spines. Stems branched and leafy, with flower-heads in small clusters at ends of branches nearly an inch long, with compact involucre, the small scales having thorny points. In most cases the male flowers are on one plant and the females on another; but in rare cases both sexes may be found on one plant. It seeds freely where male and female flowers exist near each other. Where only one male or one female plant is growing it generally spreads rapidly in a circular patch by means of its creeping roots. There have

been two or three such patches near Mount Gambier, which have only been got rid of by regularly cutting the stems when about 3in. long, during three or four years. One patch at Compton Downs, near Mount Gambier, about a rod circumference, defied all efforts to exterminate it for about five years. The soil was trenched and sifted to get out all roots; but this failed, and it spread in a much larger circle. Then a deep trench was dug around the patch; holes were punched into the soil with a crowbar a foot deep and a foot apart, and these were filled with a solution of arsenate of soda, which was also sprinkled liberally over the whole surface. Three hundred pounds of this "scrub exterminator" were used, but the thistle seemed to thrive upon it. From the first, the members of the Mount Gambier Branch Agricultural Bureau kept the plant mowed regularly before it flowered, and finally they have succeeded in exterminating it. By preventing the development of leaves for a sufficient time any plant can be killed.

**BATHURST BUR** (*XANTHIUM SPINOSUM*).—This plant causes much damage to the wool of sheep through the burs becoming entangled in it. It is estimated that wool in some parts is depreciated at least 3d. per lb. by the presence of the burs. It is a shrubby annual from 1ft. to 3ft. high; the under side of leaves and the stem are whitish; each joint of the stem is covered with sharp spines in groups of three. Leaves, lance-shaped, three-cut, the central lobe being much longer than the others. The flowers are very small, greenish-yellow, in clusters at the base of the leaves, and these are succeeded by the hard oval burs which enclose the seeds.

### How to Deal with Noxious Weeds.

It only aggravates the evil to cut the weeds whilst they have seeds upon them. They should be attacked whilst young, before they are in flower. If they are annuals and can be ploughed completely under it will be all the better; but with perennial plants and those of a bulbous or tuberous nature, ploughing would only aggravate the evil. Soursops (*Oxalis cernua*), Asphodel, Homeria, and Canada Thistle (*Cnicus arvensis*), and plants of similar nature can only be exterminated by constantly destroying their leaves directly they appear above the surface. It is best, on land infested with such persistent weeds as soursops, to grow some crop that will benefit from frequent cultivation, such as cabbages, onions, potatoes, &c. Many of the annual weeds can be exterminated by ploughing them under whilst they are quite young. Stinkwort, all kinds of Star Thistles, &c., should be ploughed completely under before they flower. If allowed to flower, the plants should be mowed closely down, gather at once into heaps and burn them, else the seeds may mature upon the green plants after being cut, and by aid of wind may be spread broadcast over miles of country. Asphodel and similar plants should be pulled by hand or chopped up before they flower, put into heaps, and destroyed by fire when dry enough.

### Noxious Weeds Act.

Under the provisions of the Noxious Weeds Act landowners and occupiers are required to destroy all of the weeds declared to be noxious which may be growing on their lands and on half of all roads adjoining. Neglect to comply with the law renders them liable to a penalty of £10.

**SUGARED FRUIT.**—Nearly all fruits can be preserved without boiling or drying by packing them in jars with alternate layers of sugar, provided the weight of sugar exceeds the weight of fruit by one-fourth to one-half. Damsons, for instance, need 1½lb. sugar to 1lb. fruit; figs, 1½lb. to 1lb. fruit, and so on.

## CONFERENCE OF HILLS BRANCHES.

The Second Annual Conference of the Hills Branches of the Bureau was held at Cherry Gardens on October 19th, 1897.

Owing to the inclemency of the weather, the attendance was very poor. There were present the following members of the Bureau:—Cherry Gardens: Messrs. J. Potter (Chairman), J. Lewis, C. Lewis, J. Choate, G. Hicks, J. Mackereth, W. Nicholle, R. Gibbins, and C. Ricks (Hon. Sec). Woodside: Mr. J. Caldwell. Mylor: Mr. W. G. Clough. Belair: Mr. Geo. R. Laffer. Forest Range: Messrs. J. Vicars, S. G. Collins, and J. Sharpe. Clarendon: Messrs. J. Wright and W. A. Morphett. Central Bureau: Messrs. W. C. Grasby, Thos. Hardy, and W. L. Summers (Assistant). There were also ten visitors, including several ladies.

### Farming.

The CHAIRMAN (Mr. J. Potter) gave a short address on "Farming." He considered the South Australian methods of farming susceptible to considerable improvement. He believed if the Bureau had been in existence earlier many mistakes which the farmers have made would have been avoided. One great mistake was made in giving the settlers in the North too much land. Having so large an area to cultivate, it was not properly worked. To get as much land as possible under crop, six-furrow ploughs were used. If he were to start farming again he would not use anything larger than a two-furrow plough on the farm. He considered a good scarifying quite equal to, if not better than, ploughing with a six-furrow plough. Another mistake was in not being particular about their seed wheat. If the farmers had been careful their land would not have got dirty. That it was possible to keep the farm clean, even if the surrounding farms were dirty, the following illustration would prove:—In one part of Victoria he visited a farm which was as free from weeds as it was possible to be, while the crops of hay being cut around this farm contained only a few heads of wheat in each sheaf. The owner was most particular in regard to his seed. He put it twice across the drake-sieve, and also had it hand-picked over. He put in 100 acres of fallow each year, and made it pay well. He never fed his horses on any chaff that was not grown on his own farm, and even carried his nosebag and chaff when travelling. He averaged over 10bush. of wheat per acre, and got the top price for it for seed. His neighbors carted their own wheat fifty miles to the nearest railway station, and gave him bag for bag and 6d. per bushel extra, so that he not only got 6d. more for his wheat, but did not have to cart it. He believed the Bureau was doing a splendid work. Since he joined the Cherry Gardens Branch he had learnt a lot. The general public have no idea of the very valuable information disseminated at the Bureau meetings, and he was sorry more did not attend. The papers which were read and printed in the Bureau journal were valuable, but his experience was that generally there was much more information elicited in the discussions on these papers. He strongly favored thorough working of the land, and it was better to make a profit of £50 on a small area than the same on four or five times the area. Most farmers will say this is all nonsense, and doubtless it may be where you have only short leases; but with long leases or freehold he was confident it was the correct method. As an instance of what thorough cultivation would do, he would mention a gentleman at the Sturt whom they all knew. This man took on a short lease a farm on which the owner had been starved out, and his friends told him he had made a big mistake. However, he got a good team of horses and a two-furrow plough; he worked the land thoroughly and well, and in a few years, in addition to paying rent and living expenses, bought

the farm right out, and in a few years more made enough to retire. Another case he knew of was an absolute new chum at farming. He rented a farm on which the owner had been starved out, ploughed it thoroughly with a team of bullocks and a single-furrow plough. He had a magnificent crop; and hay being very high owing to poor crops generally, he cleared enough in one year to purchase his land.

Mr. RICKS agreed that better working of the soil was a most important matter. Professor Lowrie had said at Appila-Yarrowie that a good working of the fallows was equal to an inch of rain, owing to the soil retaining the moisture better. He knew many blockers with less than twenty acres of land who were better off than larger holders. Having a small area, they cultivated it better, had less expense, and better crops. In the Hills district cultivating once a week gave wonderful results.

Mr. VICARS said Mr. Ricks referred to cultivation keeping the land more moist. Their trouble was that they often had too much moisture to work their best land at the proper time. In some parts as much as 100 acres of the best soil grew nothing but water grass. It wanted draining on a cheap principle. Perforated pipes were too expensive.

Mr. LEWIS said underground drains filled up with up stones, and covered with brush to keep the soil out, acted well. He had some put down in this way nearly forty years ago, and these were still in good order.

Mr. VICARS said they always had plenty of stones if they could use them. In breaking up their land for garden purposes they took out immense quantities of stones. They had tried a number of different ways of draining, but they could never rely on them. Having plenty of timber, they made trenches 2ft. wide, with drain in bottom 8in. across; covered this with slabs and then brush. This did well for a few years, but then became a trouble.

Mr. RICKS said a plan he had adopted was very successful. He got a number of flat stones, laid them in the bottom and on sides and top of small drain, then filled up for a foot or more with small stones, and covered up. This also got rid of the stones, which were a nuisance to them. Where open drains lead into these main drains, a small well must be dug to catch the silt, otherwise the drains will soon choke. Timber soon decays, and the drains cave in. It was better to take more trouble and do a smaller area.

Mr. POTTER said his experience was that the drains advocated by Mr. Ricks worked well; it was, however, most important to have a good layer of stones on top. A main drain should be put down the length of the field in the most suitable place, and then have branch drains where necessary running into it. If the main drain choked at any spot, the lower branch drains would carry off water, and they would also drain the land more evenly.

Mr. COLLINS said the best and cheapest permanent drain could be made of chipped and damaged earthenware pipes. If they were laid on a bed of broken stones, with another layer on top, they would act splendidly. These could be obtained cheaply at the works, as they were useless for general work. The water would drain along the bed of stone, and enter at the points.

Mr. HARDY thought this a good idea; there were plenty of damaged, cracked, and misshaped pipes to be seen at the pipe factories, and he believed they could get them very cheaply.

Mr. VICARS said to show the necessity for draining, he might mention that a few weeks since he had a piece of land prepared for planting out onions. He brought the plants home with him to set out next day, but heavy rain fell, and the drains not working effectively, the land got saturated, and it was a fortnight before he could get on to it again to work it.

Mr. COLLINS said they would find slab drains, if well laid, would last for many years if the land does not wash.

### Sweet Ensilage.

Mr. RICKS asked if any of those present had any experience in making sweet ensilage. He had a good many tons of lucern and other green stuff which he did not require for use at present, which he would like to cure as sweet ensilage.

Mr. COLLINS said on a station in the Far North, when they got a good season and plenty of cane grass, they cut it, put it in wool bales, and pressed it. This kept good for a long time, and stock ate it readily. The bales, of course, are spoilt for other purposes.

Mr. POTTER thought if they could save about a ton of valuable food at the cost of the wool bale it was cheap.

Mr. VICARS said he tried ensilage, but made a failure of it. Several in the Woodside district went in for ensilage a few years ago, and spoke very highly of it for a time. He noticed, however, that they had all, or nearly all, given it up now, and thought there must be a very good reason for their action. As for himself, he could not see the necessity for ensilage-making in the hills. They could grow green food of some description all the year round, and why should they go to the trouble and expense of pits for ensilage?

Mr. HARDY said about the biggest lot of ensilage he ever saw was at a dairy farm in Victoria, where they kept a very large number of cows. The pit was simply dug out on the slope of a hill, and the sides made as smooth as possible, but not built up in any way. The owner was well satisfied with the ensilage made.

### Orchard Pests.

Mr. RICKS wished to know the best means of keeping the hares from destroying fruit trees. He had tried several methods, including rushes tied round, but in some cases the hares went up the rushes and ate the young shoots above. Wire netting the whole orchard was too expensive for most of the growers.

Mr. POTTER said he had tried various plans, including traps. He took three months to catch one hare in a trap. The only way he found successful in keeping them down was by shooting them.

Mr. COLLINS said a mixture of bullock's blood and lime painted on the stems at the beginning of the winter kept the hares off. They did not seem to like the flavor of it.

Mr. RICKS said the rabbits were increasing in the district, and would have to be dealt with in the near future.

Mr. POTTER said he had noticed that the hares did most harm when there was plenty of feed elsewhere. Rabbits would never be a serious trouble here, as the natural enemies kept them in check. One great injustice was the action of many landowners in refusing to allow the hares and rabbits on their land to be hunted or shot. He had shot as many as fifty hares in a month while doing his ordinary work.

Mr. POTTER inquired the best way of poisoning sparrows. The ordinary poisoned wheat was practically useless; the sparrow would not touch it. Even if good grain was spread for several days, and then poisoned grain substituted, if one or two birds got to it and died, the others would not pick up a grain. He found best results by sprinkling poisoned grain on the haystack after cutting it.

Mr. COLLINS said Mr. Downing, of Kanmantoo, told him he destroyed great numbers of sparrows by distributing poisoned wheat round the edges of the paddocks after sowing. He dissolved strychnine by boiling it in vinegar, and then added brown sugar, and soaked the wheat in it. Very little, however, could be done except by united action.

Mr. HARDY said Mr. Downing's plan would act well. If the Act was amended to make it compulsory for all district councils and corporations to pay for heads and eggs, he believed there would soon be a very considerable reduction in the numbers of the pest.

Mr. RICKS said the local council pays for eggs and heads, and the Branch offers a prize for the person collecting the largest number each month. He believed this had had a beneficial result.

Mr. VICARS had noticed that the General Secretary had been advised that there was no danger of introducing the fruit fly (*Tephritis Tryoni*) with bananas, oranges, pineapples, and passion fruit from Queensland. From all accounts this pest was far worse than anything we had here; and as it was spreading in New South Wales also, he thought every reasonable precaution should be taken to prevent its introduction into South Australia.

Mr. SUMMERS stated that the Central Bureau had been advised by the Entomologist to the Department of Agriculture in Queensland that the fruit fly did not attack the fruits mentioned. If anything was done in the way of precautionary action, it would mean that all fruit from the other colonies would have to be disinfected on arrival.

Mr. RICKS thought they were justified in urging the necessity for disinfecting all fruit introduced from these colonies. The Hills districts were specially interested in the matter: it will be national calamity if this pest is introduced.

Mr. HARDY said it was a question as to how far disinfection would be effective.

Mr. VICARS said the advice from Queensland would naturally be affected by the fact that they did a large trade with South Australia with the fruits mentioned. He did not believe in putting undue restrictions in the way of bringing in fruit from other colonies, but considered they were justified in doing all in their power, even at some inconvenience to importers of fruit, to keep out this dreaded pest. The following resolution was carried unanimously:—"That this Conference of Fruit-growing Branches of the Bureau respectfully request the Central Bureau to take into serious consideration the necessity for taking all necessary precautions to prevent the fruit fly being introduced with fruit from Queensland and New South Wales."

Mr. LAFFER said this only showed the necessity for the appointment of a competent economic entomologist. The fruit industry alone was of sufficient importance to justify such appointment. We had a number of pests here which we did not know how to deal with satisfactorily, and there was always the danger of introducing new ones. If we had an entomologist, he could study these insects on the spot, and in all probability would be able to help us in combating them. He did not think it right that we should be dependent on the courtesy of entomologists in the other colonies.

Mr. HARDY supported. He considered an entomologist for South Australia very necessary. He believed a real good man could be obtained in the colonies at a comparatively small cost.

Mr. VICARS agreed. There was no doubt that a careful study of the codlin moth in the gardens by a competent man would help them. In a very large garden at Forest Range they had had this pest for five years, yet it did not increase; in fact, it seemed to be going back. He firmly believed some parasite was at work, and if this could be settled it might help the growers considerably.

Mr. LAFFER said he knew of a very similar case at Coromandel Valley. In this particular garden the codlin moth had been present for years, yet it did not seem to increase to any extent. He moved—"That this Conference, recognising the great importance of preventing the introduction of injurious



insects, would urge on the Branches of the Bureau in the fruitgrowing districts the necessity for taking united action in endeavoring to secure the appointment of a competent economic entomologist." This was carried unanimously.

### AFTERNOON SESSION.

## Water Conservation and Irrigation in the Hills.

Mr Ricks read the following paper:—

This question, I think, is a very important one, bearing in mind the experiences we have passed through these last two years. For five or six months each year we have thousands of tons of water going to waste, while very often our cattle for months together do not get sufficient feed. The consequence is they get poor during the autumn and winter, and it takes two or three months to get them in condition to give much milk, and we often lose the chance of the best prices for our butter and other produce.

Nature has provided splendid places in our hills for conserving water if man will assist ; all that is required of him is to dam these watercourses and creeks, the expense of which need not be great. There will of necessity be different ways in different places of doing this. If in a creek that has running water for four or five months each year, I should suggest building a wall of stone or brick, first getting a good foundation, so as to make a good strong job. If the wall is to be 12ft. high, I would advise building the first 8ft. 6ft. in width, the other 4ft. 4ft. wide, leaving an opening in the centre at the top of the wall 1ft. deep by 12ft. long, to give room for the water to run away in floodtime. Cement the wall on both sides from top to bottom ; if you have good holding ground in the banks, your dam will hold like a tank. To get the water out of the dam for irrigating purposes, put a 4in. pipe, or other size if required, from 1ft. to 2ft. from bottom of dam, with a tap at the outlet, so that you could connect it with other pipes or trenches cut in the land. The pressure from a good body of water would force it a long way ; or you could get a hydraulic ram, which for every foot fall of water will force it in a smaller stream 10ft. high. The price of these pumps is from £3 2s. 6d. to £8 10s., according to size.

Another dam that could be constructed in what I will call a blind creek, that is where the water runs only for a time after rain, would be cheaper. It could be made with a clay bank across the gully, with a pipe in bottom, as described before; these dams would require a by-wash on each side, to take the floodwaters when full, or the water will swirl the dam away. Then there is our underground water, there has been but little done in these hills, so far as I am aware, to find out what water there is beneath our feet. The fact that there are a good many springs that are strong enough to rise to the surface shows that there are large bodies of water deeper that would pay for boring or sinking wells to obtain. I believe we should get good supplies in many places at 50ft.; we could harness the wind to draw the water, and could get a windmill and pump for £25. Of course you would require pipes according to the depth of well.

There is another simple mode of irrigation—that is, winter irrigation. If you have a creek or water running, after rains, cut a few small trenches and run the water over your crop of lucern or grass, as the case may be, as these waters carry large quantities of fertilizers that will be otherwise wasted.

The following information as to yield of irrigated land is taken from a paper read by Mr. J. J. Green, before the Chamber of Manufactures:—"I submitted the following questions to a grower, upon whose record I can rely, asking for replies on the best conditions under which he had worked. Q. What weight per acre per annum can you get from lucern thoroughly irrigated?—A. Thirty-six tons; that is with two manurings during the winter, and one in summer. Q. What do you think the average crop of lucern grown in your district would be?—A. Twenty-five tons, including irrigated and non-irrigated land. Q. What do you estimate the weight of sorghum per acre, two cuttings?—A. Sixty tons. It must be understood with this that the land must be well manured and the hose kept constantly at work to irrigate thoroughly. Mangolds would be another valuable plant. Its productiveness and value on the farm none will deny, and I have had the following statement tested carefully by weight, so that there need be no hesitation in accepting the produce per acre at ninety-six tons, with every attention, and the water regularly and sufficiently applied."

The question is, will it pay to irrigate? The following figures have been supplied to me from the Customs House for the year ending June 30th, 1897:—

	Imported Value.	Gross Duty.
	£ s. d.	£ s. d.
Hams and bacon .....	3,957 0 0	1,021 17 1
Butter .....	25,678 0 0	4,314 0 6
Making a total value of £34,965.		

This would give 699 producers an income of £50 for the past year, if they had by means of water conservation been able to produce the above in the colony. Then there is another item : fresh fruit, that has been imported in the same period to the value of £14,365. Duty (gross) £2,449 3s. 9d., or a total of £14,814 2s. 9d. These fruits consist largely of oranges and lemons. I could not get the exact quantity of oranges and lemons, as they are not kept separate at the Customs House, but from Italy alone lemons to the value of £260 were imported. I believe there are plenty of places in these hills where we could grow them with water properly applied, and we should be able to put them on the market after the plains had done, thereby keeping up a supply all the year round. Many other things we could do if we had the water, which I have not mentioned ; but I think I have shown that there is enough to encourage us to try and take advantage of our natural opportunities, thereby increasing our income and the national good. I feel sure, if we could carry out some scheme of water conservation, that there is room for thousands more of our fellow colonists in these hills. They and we would be benefited ; and, instead of living in the dry and uncertain North, trying to fight Nature, they could live in comfort, and keep themselves and families without having to apply to charity and the Government to assist them every few years.

I do not think I can close this paper better than by quoting the following remarks made by Mr. J. J. Green in his lecture on "Water Conservation," before the Chamber of Manufactures. He said :—"The settlement on the land is the continual cry, but settlement without the opportunity of realising its purpose and possibility more completely, will not assist the general well-being. What we want is less land, but more production ; an opportunity for those engaged on the land to use the commonsense God has given to every man to intelligently assist Nature to offer her gifts as a reward of patient, persevering industry."

Mr. HARDY said he believed that very considerable use could be made of the Happy Valley reservoir for irrigation purposes. At 6d. per 1,000 galls. it was doubtful whether it would pay to use. In California immense use was made of water. Too much water, however, had an injurious effect. Many places in the hills were very suitable for conserving water on a small scale.

Mr. VICARS asked whether Mr. Ricks advocated water conservation by individuals or by united action. His experience was that for irrigating vegetables it required too big an expenditure in their district to provide storage except on a running stream ; and here they would require a competent engineer for the work, or the dams would burst and wash away their gardens.

Mr. RICKS said he advocated building dams on the watercourses. If several could unite to make a large reservoir in a suitable spot, so much the better. He was told, when he built his dam, that the first flood would carry it away. It had, however, stood a good many floods during the past eleven years, and was still holding. If built strong enough to stand the first weight of water, and provided with overflow, floods could not injure it, as the floodwaters came in at the back end, and the water already in the dam acted as a sort of cushion. He had had a stream 30ft. wide flowing over the top of his dam without injury. A dam such he had described could be put up for £20. Even if only half an acre could be irrigated and green fodders grown it would pay. In many cases they could get strong supplies of underground water by means of wells and bores, and also by opening up springs. In the gully he was in there would be no difficulty in making three or four more dams like the one he had, and if he could afford it he would make one or more. The value of the cattle lost in the district last year from impaction caused by want of succulent feed would have paid for several such dams.

Mr. CLOUGH said he had sunk a dam some distance up the gully, and by means of an ordinary syphon got the water to flow to his garden. A fall of about 20ft. was necessary with this method. The water was distributed by means of canvas piping.

Mr. VICARS said dealing with waste floodwater was very different to dealing with a flow of water such as Mr. Ricks had. With the farmer the water gave out just when most wanted, and the plants died.

Mr. RICKS did not think so. They could construct a bigger dam if they wanted a bigger supply. Although he had not made much use of his dam, owing to want of knowledge in not putting in a pipe at the bottom of the dam

so that the water could be distributed by gravitation, the water was there, and, several times each summer was overflowing in consequence of rains. He had no continuous flow of water; above him the watercourse in summer was dry; but below, the soakage from the dam kept a considerable area nice and green during the summer, and this alone paid him for his expenditure. If only to grow feed for a few cows, so that they could produce milk when butter was high in price, they would get a good return on an expenditure of £100. He did not refer so much to irrigation of vegetables as to such plants as sorghum, maize, lucern, &c., which only required an occasional soaking.

Mr. GRASBY said too much importance seemed to be attached to the necessity for irrigating summer fodder. With good cultivation in the hills they could rely on good crops. At Roseworthy, where the rainfall was very light, Professor Lowrie got good yields from sorghum in three years out of five.

Mr. POTTER said that at Clarendon Mr. J. Wright irrigated several acres by raising water from a well into a tank by means of a windmill.

Mr. HARDY said they could not irrigate any area with a windmill without plenty of storage.

Mr. VICARS and Mr. GIBBINS said they found the mills utterly useless for irrigation purposes in the hills. You could not irrigate direct from the mills, and must have plenty of storage. When most wanted the mills were not working.

Mr. LEWIS said there was no doubt that in some specially suitable localities in the hills there always seemed to be a breeze of some sort, and in such places no doubt windmills paid.

Mr. COLLINS said he found the Simplex water-lift, costing about £15 with buckets, to lift from depths of 15ft. to 20ft., best. He had one which drew more water than a 3in. pipe would carry away. Another at Balhannah he knew of was doing equally satisfactory work. They were independent of the wind, and with a good spring did not require storage, which was expensive.

Mr. HARDY said a neighbor of his was using a 6 or 8 h.p. oil engine, and irrigated about ten acres of lucern. It cost him for fuel at the rate of  $\frac{3}{4}$ d. for each 1,000galls. of water raised. As far as he could see there was no reason why these engines should not last just as well as a steam-engine, and they were not very expensive.

Mr. GIBBINS said he knew of a gas-engine that had been in work for fifteen years. They should be no more trouble than steam-engines.

In reply to questions, Mr. GRASBY said hydraulic rams were no use except where you had a bigger flow of water than you required for actual use, as there was so much waste.

Mr. RICKS said his idea of making reservoirs up in the gullies was that they could irrigate the flats below without having recourse to mills or engines of any sort. He asked whether oranges and lemons could be profitably grown in the hills. Most of those he had seen had been planted in the moist spots, which were very cold in winter, and after a few years of productiveness they died.

Mr. HARDY said he had seen good healthy trees in several places, but the fruit was not first class, the skin being too thick. Too much water will kill the trees in time.

Mr. GIBBINS said the trees in the hills mostly died from bark rot when about twelve years old. He had seen some splendid specimens of lemons with thin skins grown on young trees, but it remained to be seen whether they would last.

Mr. GRASBY said it seemed to him that it was quite possible they had been planting the trees in wrong situations, and that the well-drained hill slopes would produce the best quality of citrus fruits. In Sicily splendid lemons were grown at an elevation of 1,500ft., with a range of temperature from 1° below freezing

point to 95° to 100° F., and a rainfall of 22in. This very closely approached the climate of our hills. The soil was principally loam on a well-drained clay subsoil. The trees are always irrigated, and the fruit is of the highest quality. Sometimes they had as much 17° of frost; we never had that here, and the worst places were the flats. He thought it possible, therefore, that there was a big future for citrus cultivation in the hills in suitable soils. He emphasised the fact that whatever situation was selected there must be good drainage.

### Low Pruning of Apple Trees.

MR. GRASBY initiated a discussion on the pruning of fruit trees, particularly apples and pears, his purpose being to urge the advantages of starting all newly-planted trees from near the ground, and of bringing back large old trees within reach of the hand. The advantages are (1) ease with which the orchard may be worked; (2) readiness with which codlin moth and other pests can be treated (this applies whether spraying be adopted or not); (3) economy in gathering the fruit; (4) finer and more saleable fruit, evenness of cropping, and a better average yield. He was born in the Glengyle Orchard, when there were very few orchards in the Mount Lofly Ranges. The system under which the trees have been allowed to grow into large spreading trees may have been wise under the old conditions, at all events their orchard did not differ from most of the others until his brother adopted a new system a few years since. All will agree that when we have to fight pests and grow fruit for a foreign market, we must consider the best and cheapest methods. The Angaston orchards are more easily and cheaply worked than many of the Mount Lofly orchards: but he thought the system most suited to our needs is that adopted by the large growers in the Derwent Valley, Tasmania. Briefly, the system is this: The trees are planted somewhat closely. The general distance for apples is a rod, giving 160 to the acre; but some plant 15ft., 14ft., and even 12ft. apart. The trees are trained low, and as nearly as habit and circumstances allow, are made to form an inverted cone with its apex about 8in. or 12in. from the ground. The tree is brought into bearing earlier than is usual with us in order to check the too vigorous growth. The tree is usually formed of from five to eight main branches, starting as nearly as can be at a foot from the ground, and by summer-pruning these branches are clothed in fruit spurs from their junction with the main stem. The more frequent custom is to keep the tree open in the centre, but a few large growers do not do this. The trees are generally summer-pruned shortly before the apples are ready to gather, in order to let in the sunlight and color the fruit, as well as to save winter-pruning. With young trees the main branches are allowed to run away at will to use up the surplus sap, and to enable the grower to keep command of the lower portion which he is forcing into bearing wood. When the tree is cropping heavily at from seven to nine years of age, these long branches are shortened back, and the tree is then entirely within reach of the hand. He had every confidence in recommending the system, and felt sure that those who adopt it will find he had not overstated its advantages. Apart from the domestic garden, he knew of only one important reason for planting and working an orchard, and that is to make as large a profit as possible, and the system described will assist in attaining this desirable object.

MR. POTTER said he had learnt something he had been trying to find out for a long time. He had tried to prune his trees on the system advocated, but the more he cut the more they grew. He could see now where he had made a mistake.

MR. LAFFER said he had studied the system mentioned by Mr. Grasby, and recognised its many advantages. It was difficult to prune large old trees, and they were therefore neglected, consequently the fruiting is very irregular—one

year a heavy crop, the next very poor. He believed they could regulate the crop to a very large extent by proper pruning. He has tried it for several years, and finds that the crops are far more even. The same thing applies to plums. Last year the trees were so loaded that in many cases they broke down, and it will be two or three years before they bear a good crop again.

Mr. GIBBINS agreed that there were many advantages in this system, but with 1ft. standards they would have difficulty in cultivating with a team. Clean land well worked was a necessity.

Mr. VICARS said he found that with trees pruned on this system he could, by cutting off the branches which came in the way of the horses, cultivate well with the scarifier; but he found he had to be always cutting off limbs until the tree was ruined. He thought Mr. J. C. Grasby was making a great mistake in cutting his trees down, but he was greatly surprised at the result. The low limbs were strong and firm, the fruit borne evenly along them, and they did not spread out much with the weight; consequently they were far less in the way of the team than the old tall trees bending down to the ground with the weight of fruit on the ends. If the system was properly carried out there would be no sawwork afterwards. With the present system they were always cutting away large limbs.

Mr. W. C. GRASBY said the Tasmanian experience was that it was easier to cultivate between trees pruned on the system mentioned, and planted only 16ft. apart, than on the old system and 25ft. apart. The five to seven good stiff branches open out a little, but do not bend much. Sturmer Pippins and Scarlet Nonpareils lend themselves very readily to this system, while Cleopatras are not so good. Each variety must be studied and treated according to its character of growth, keeping the main principle in sight. The best cultivated orchard he ever saw was pruned in this way; and, although the land was actually being cultivated while some of the fruit was being gathered, very little was knocked off.

Mr. RICKS asked how the pruning would regulate the crop?

Mr. LAFFER said when the trees were allowed to form so many fruit-spurs they were overtaxed, and consequently the following year did not bear a good crop. If properly pruned, the formation of fruit-spurs was regulated, and consequently the crops were more even.

Mr. GRASBY said his brother's experience was that this system did make the bearing more even, and was profitable. Last year he had a fairly good crop, and this year there was a good show. Adjoining orchards, that bore heavily last year, had little fruit this year. Some people argued that this system was unnatural. This was an absurd objection to make, as the whole system of fruit-growing was unnatural. Fruit, under present conditions, was the result of generations of care and attention; if grown naturally, they would soon deteriorate.

Mr. LAFFER said he cultivated very close up to his trees. He had a lot of No. 3 or No. 4 fencing wire about; he cut this up into 2ft. to 3ft. lengths, making a crook at each end. With these he hooked back to the strong centre branches any branches that came in the way of the teams or implements.

A desultory discussion on summer-pruning, and pruning of apricots and cherries, followed.

### Next Conference.

Mr. RICKS said they had to consider whether they should hold another Conference next year, and where. From the poor attendance it appeared to him a question as to whether they should continue holding these Conferences.

Mr. VICARS thought if Mr. Ricks had had to travel ten to twenty miles that morning to attend the Conference, he would not have been surprised at the

poor attendance. He thought it would be a pity to give up the Conference. They could always gain something by interchange of ideas.

Other members supported, and Mr. Clough invited them to meet at Mylor next year. It was decided to accept this invitation; and a vote of thanks to all those who had taken part brought the meeting to a close.

#### EVENING SESSION.

In the evening Mr. W. C. Grasby delivered an interesting and instructive lantern lecture on "Some Lessons to be Learned from the Fruit Countries of the Mediterranean." The hall was well filled with an attentive audience, who listened with interest and amusement to the lecturer's descriptions of the primitive and curious customs and implements of the Greek, Egyptian, Turkish, and Sicilian agriculturists. The lecture was illustrated by sixty photographic slides taken by Mr. Grasby during his recent trip. These were shown by means of the departmental lantern and the acetylene gas. At the close various questions were asked and answered, and a hearty vote of thanks was accorded to the lecturer.

### CONFERENCE OF YORKE'S PENINSULA BRANCHES.

On Saturday, October 23rd, a Conference of the Southern Yorke's Peninsula Branches of the Agricultural Bureau was arranged to be held at Minlaton. Professor W. Lowrie and Mr. A. Molineux (Secretary) attended from the Central Bureau. Unfortunately only two Branches were represented at the Conference, the following members being present:—Minlaton: Messrs. J. Martin (Chairman), M. Twartz, J. H. Ford, James Anderson, J. Fletcher, W. Correll, S. Vanstone, J. McKenzie, A. McKenzie, R. Higgins, J. Bennett, J. Anderson, and Joseph Correll (Secretary.) Yorketown: Messrs. C. Domaschensz, and J. Koth.

#### Inspection of Crops—Results of Manuring.

On the previous day the visitors were driven round Stansbury, Brentwood, and Minlaton by Mr. C. Faulkner (Stansbury), Mr. M. Twartz, and Messrs. Correll Bros. (Minlaton) for the purpose of inspecting the crops. During the past three years the practice of putting in the seed with commercial fertilisers by means of the drill has very largely increased owing to the highly satisfactory results obtained from the crops put in this way. This year a considerable area has been drilled in. Around Stansbury a careful estimate gives the area so sown as over 2,500 acres, round Yorketown 4,500, and Minlaton (taking in the hundreds of Minlacowie, Koolywurtie, and Curramulka) nearly 11,000 acres. Allowing for other portions of the district, it will be seen that considerably over 20,000 acres have been drilled and manured. Almost without exception the difference between these crops and those broadcasted is most marked. In some cases strips were left in the paddocks without manure as tests; these invariably show the advantage of the manure. Where the land was sown early the crops did not show well, the failure being due to the dry sowing and dry working of the land. Land that was ploughed up late was also poor; but in both cases the broadcasted parts were much the worst. At Messrs. Correll Bros.' farm a very nice crop of Algerian oats was seen, which, notwithstanding the absence of rain during the past month, will probably yield from five to six bags per acre. The owners use Algerian oats for hay and find

that if cut when the tops begin to ripen, not when green, they make excellent feed for horses. About twenty acres of mustard upon which sheep had been grazing, and which was also fed with advantage to the horses, was also noticed here.

#### AFTERNOON MEETING.

On Saturday afternoon the Conference was held in the Minlaton Institute, there being a good attendance of farmers from Yorketown, Brentwood, Minlaton, and surrounding districts.

#### Indian Runner Ducks.

Mr. R. HIGGINS read a paper on "Indian Runner Ducks," of which the following is the substance:—

It is generally admitted that Southern Yorke's Peninsula is specially adapted for egg production, the climate being so suitable, and the limestone country providing many of the necessary constituents required to make this industry a success. Large numbers of eggs are produced here annually, one firm alone ships over 100,000 dozen a year. If we add to this the number sent away by other dealers and the large quantity consumed locally we shall then be able to form some idea of the magnitude of our egg trade. I think the introduction of Indian Runner ducks would very materially increase our annual quantity of eggs for export; and, more than this, they would give us a good regular supply of eggs when most required, that is, when here eggs are scarce and prices are very high. They are remarkable for their egg-producing powers, laying regularly all through the winter. As ducks are not flyers nor scratchers, they would be less likely to damage seed crops than some kinds of fowl are.

The pair of Indian Runners I have here on view were bred by Mr. W. B. Rounsevell, from stock imported by himself last December. Writing to me in June, he said, "They are not much to look at, but for laying they are real wonders," and he added that his three ducks had laid close upon 400 eggs, and were still laying well. The duck I exhibit to-day began laying on August 8th, and has laid seven eggs a week since then most regularly.

Writing in *Poultry*, Mr. Mathew Hunter, an English breeder, says of Indian Runners, "They were brought over by a sea captain from India, and were called 'Indian Runners.' They very soon proved themselves of such sterling merit as layers, not being affected in the least by the weather, that they quickly became great favorites, and the demand for them at once rose to such an extent that it was difficult to procure them pure. It is no unusual thing for them to lay all through the winter, even in the most stormy weather, whilst it is on record that some have commenced to lay at seventeen weeks old. Again, they are very regular layers, only missing occasionally; they are hardy both as ducklings and adults; they are a non-sitting breed, and rarely, if ever, become broody. I can, with confidence, state that they are the ducks to supply the table with eggs, and to those who prefer duck eggs to hen eggs they come as a boon, as they can almost be relied on all the year round; hence one need never despair at not being able to have ducklings when others can scarcely get eggs. I consider them the most profitable breed to keep, as they will pick up almost all the food they require, returning for a little supper and bed, which saves much time in duck-hunting. As for a morning meal, they never look for any, and cannot be persuaded to stop and have it, preferring to find their own. They are not particularly fond of the water beyond a bath and a drink, and their sole aim seems to be to roam about the fields in search of insects or animal food."

#### Commercial Fertilisers.

Professor LOWRIE delivered a very instructive address on "Commercial Fertilisers," of which the following is the substance:—

Ten years ago the average farmer in South Australia would not hear of artificial fertilisers being profitable. He had time after time argued that commercial fertilisers could be profitably used in this country, but he was invariably met with a shake of the head and a reply to the effect that it would not pay. Well, he thought it did pay, because many had now adopted the practice, and from what he could hear regarding contracts for the coming year it was evident that they thought he was justified in the course he had taken in urging them to pay more attention to this question of artificial manures. The manures were not only being used in that district, but pretty well all over the colony. The matter was, however, being boomed to a degree beyond which it was justified, and by saying that he meant that the farmers were taking

up the practice of the use of artificial manures in the drier districts of the colony, where the rainfall was not sufficient. In such districts it was no use expending money on these manures. It must not be forgotten that where there was a rainfall of 11in. to 13in. or 14in. the possibility of taking a heavy crop out came but seldom. In the North they got a crop of 20bush. to 25bush. very rarely indeed. If they fallowed the land and did not come back too frequently, and took a good crop when the rainfall admitted of it, he thought better results would be obtained, but where the rainfall was higher—here they had an average of 18in.—they did not yet know the possibilities of manuring. He was confident that the manure trade would develop into something very large in South Australia, and that it would be the means of raising the average to 11bush. at least. It would be a wonderful advantage to South Australia. He believed that if the majority of the farmers would work their land as thoroughly and with such intelligence as units here and there do, the average for the colony would be at least 14bush. In every district one found that there were men who always had good crops, but their neighbours apparently did not put “elbow grease” on the land, and only reaped dwarf averages. He was not going to argue for commercial fertilisers as being ahead of farmyard manure. Of course the latter was the best. Manuring was not only a matter of returning the chemical constituents to the soil, which might be just as thoroughly done by artificial manures, but the other was nature’s manure, and its physical influence on the soil was to make it work more freely and absorb the moisture better. These were only side conditions, but they were very important ones from the point of view of the farm. He admitted that South Australian practice did not allow them to get sufficient farmyard manure. They could not keep a large number of cattle as in some other countries. In England and Scotland some farmers spent large sums—from £300 to £400 a year—on artificial foods, despite the fact that they grew a large quantity of fodder. This they did simply to save their manure bill. In South Australia, however, this could not be done, so they had to fall back on artificial manure. More than a generation ago agricultural chemists discovered what elements were essential to the health of vegetation. They found that the constituents in the soil which were absolutely indispensable were nitrogen, phosphoric acid, potash, sulphur, iron, and lime, and of these iron was not likely to become deficient in most soils, while the same could be said of lime, which was used for making the soil freer, but was only essential as a manure in rare cases. Thus they were left with phosphoric acid, nitrogen, and potash, and if they would glance at the analysis of the manures now on the market they would find that they all contained one or other of these substances in various forms. The great want in South Australia was phosphates. Even now land was often wanting in this particular. Bonedust had been used a long time, but it was not so readily soluble as superphosphates. Bonedust contained from 3 per cent. to 5 per cent. of nitrogen, and sometimes the soil required this, but if they took off a crop, say, for instance, once in three years the land had time to recover itself and to absorb sufficient nitrogen from the air, so that in reality nitrogenous manures were not required. He knew that in South Australia, unlike other countries, nitrogen was not so necessary as phosphates. In his opinion, the reason for this was that the soil was not under-drained, and that the nitrogen when dissolved was not drained away, but left in the soil and made its way back towards the surface in summer. Superphosphate when dissolved was in much finer particles than bonedust could be ground into, and this was a very great advantage. The distribution was much better. Personally he had obtained best results so far from the Colonial Sugar Refinery Company’s superphosphate. By the assistance of an analysis and a guarantee, which they should insist upon receiving when purchasing the manure, they could work out for themselves without having obtained a knowledge of chemistry the relative values of the manures by reckoning the units of phosphoric acid at so much per unit. It would be a good thing if the Bureau journal published what the current values of these units were. Potassic manure was not likely to be very much required. It had had a trial at Roseworthy, but he had not discovered that it was of much benefit. However, it might be wanted on some lighter land. Farmers had to discover these things for themselves, and this could only be done by them experimenting. Certainly chemists could analyse the soils, but with small plots they would see the thing work out by itself plainly. He would advise heavy dressings in these trials in order to make the results as plainly perceptible as possible. In that district they appeared to apply from 80lbs. to 125lbs. of the artificial manures to the acre; but this, in his opinion, was too little, and it would be better to use, say 2cwt., which would in England, Germany, and France be considered only a light dressing. In Germany, for instance, they spent as much as £7 per acre on fertilisers for sugar beet growing, and a Scotch farmer thought it nothing extraordinary to use 7cwt. to the acre of artificial manures. Naturally the expense would be greater, but they would eventually get it all back, while they would also get the land into heart much sooner. A district like that in which they resided should carry crops going from 15bush. to 20bush. to the acre with an 18in. rainfall. It could be done and would be done by using 2cwt. of phosphatic manures with  $\frac{1}{4}$ cwt. of nitrate of soda added.

An interesting discussion followed, and a number of questions were asked and answered.



### Weevils in Barns

Mr. M. TWARTZ, for Mr. C. Domaschenz, read a paper on this subject. He said that about nine years ago he purchased some bran and pollard which must have been affected with weevils, and for some time he had considerable annoyance from them. He tried burning sulphur in the barn, without success. Bi-sulphide of carbon had also been experimented with, but still the weevil kept on increasing. Last year he offered wheat to a wheatbuyer, but it was refused on account of being too full of weevil. In October of last year he cleaned the barn thoroughly, and whitewashed the walls with lime and lake salt, and covered the floor with the latter. After an hour had elapsed he was astonished to see the walls almost black with weevils, but they all disappeared after several weeks. He left the salt on the floor, and last harvest again put wheat, barley, and oats into the barn, and until the present present weevils had not been discovered. The barn was constructed of stone, with a galvanized-iron roof and a lime floor.

A short discussion followed.

### EVENING MEETING.

#### Dairying.

Mr. A. MOLINEUX initiated a discussion on "Dairying." He was of the opinion that dairying for export would not pay on Yorke's Peninsula. Possibly at the northern end they could find an outlet for dairy produce by supplying some of the mining townships, but still every farmer in the south should possess a cow or two—sufficient to meet family requirements. Any waste could be used as food for pigs and fowls. In that district there was a big industry in fowls and eggs, and it was possible for this to be considerably extended. Therefore the waste that might accrue would be very useful. The class of cow now to be seen on the majority of farms was not absolutely the best for the purpose. What they wanted was a cow that would give a large quantity of milk on the smallest amount of food. He urged the claims of ensilage as a food for cattle, and recommended farmers to go in for it more largely. Allusion was made to what is commonly known as the "mysterious disease," but which was due to the unsuitable dry fibrous nature of the food which they chiefly had to subsist upon.

Discussion followed, in which Professor LOWRIE said that if cattle were given bonemeal and salt in their boxes to lick their condition would greatly improve. In England bonedust was extensively used—it was also largely used in Scotland—for the purpose of keeping the animals in good health.

Mr. J. CORRELL stated that recently he had given his cattle a little superphosphate dissolved in water. He had noticed a decided improvement in their condition, but he did not continue the experiment, as he was trying the effects of molasses. He noticed that his stock greatly preferred to graze upon land that had been fertilised with phosphatic manures.

A comprehensive vote of thanks to the ladies for providing luncheon and tea and to those who had taken part in the conference brought the meeting to a close.

**SPRAYING.**—No one can make a real spray by using a squirt, or syringe, or aquapult. These implements throw the liquids in a heavy deluge, which bends the foliage down, sheltering the parts beneath, and wastes the liquid. With a proper spray nozzle the liquid is thrown out in the form of a fog or cloud, which floats on the air and envelops every part of the tree or plant with a thin film of the spraying liquid.

## IMPORTATION OF BULBS FROM JAPAN.

Owing to the prevalence of a serious disease in Japan affecting *Lilium* bulbs, a proclamation has been issued by His Excellency the Governor prohibiting the importation into the province of South Australia of all bulbous plants from Japan. Any breach of this proclamation renders the offender liable to a fine not exceeding £50.

## POULTRY.

### DISEASES OF POULTRY.

BY D. F. LAURIE.

(Continued.)

Iron in some form is necessary for poultry. Most fanciers and breeders put a little sulphate of iron (copperas) in the drinking water, especially in cold, wet weather, and during moulting season. The most convenient method is to pour a pint of boiling water upon 2ozs. of sulphate of iron, and add two table-spoonfuls of this to each quart of drinking water. The drinking vessel should be of earthenware, because if tin or zinc is used the birds may get poisoned. Earthenware fountains are often used, but are hard to clean. A 6in. flowerpot with a cork in the hole in the bottom is very serviceable, and is, moreover, easily kept clean.

The great thing to do as regards ailments of poultry is to so manage that none make their appearance. However, as some do occur, readers may as well know what to do to guard against and even cure them. Sometimes young birds get wet, and in consequence are liable to colds, &c.; in such cases a moderate use of any of the following well-known powders may be made. Only sufficient is to be used to give a distinct flavor to the food, which may consist of various meals and mashed potatoes, &c.

For sudden colds, or even a wetting, a few feeds of hot meal or bran and pollard, seasoned with ground ginger, will, as a rule, prove effective. The following powder is still more so:—Liquorice (compound powder), 2ozs.; ginger, 2ozs.; cayenne pepper, 1oz.; aniseed,  $\frac{1}{2}$ oz.; pimento, 2ozs.; sulphate of iron, 1oz. Powder and mix well. An excellent tonic for young turkeys is as follows:—Cassia bark,  $1\frac{1}{2}$ oz.; ginger, 5oz.; gentian,  $\frac{1}{2}$ oz.; aniseed,  $\frac{1}{2}$ oz.; carbonate of iron, 2 $\frac{1}{2}$ ozs. Powder and mix. Young turkeys, especially in South Australia, where they are so much inbred, are very susceptible to weather. Motto:—Never breed-in with turkeys; procure a change of blood.

People sometimes have fowls which simply need a tonic in order to make them do well. In such cases the following powder may be used with good effect, as the birds improve the quantity may gradually be lessened:—Cascarilla bark, 2ozs.; aniseed,  $\frac{1}{2}$ oz.; pimento, 1oz.; malt dust, 2ozs.; carbonate of iron, 1oz. Powder and mix. If the birds are in poor condition, add a little sugar; but use sparingly and not continuously.

Hens sometimes become egg-bound, and are quite unable to lay the egg; in such cases assistance must be given. The usual symptoms are as follow:—The hen frequently visits the nest, and will often be seen half-standing there for some time. They often wander about with the head held unusually erect, the wings and tail drooping, and generally appear restless and distressed. The following treatment should be proceeded with as soon as possible:—Immerse the vent in warm water, and foment it for some time; this will often relax the

parts sufficiently to allow the egg to pass. Failing this, carefully inject an ounce of slightly warm salad oil. In some cases the egg gets broken, and if not removed will cause inflammation of the egg passage (oviduct). To do this, pare the nail carefully and after oiling insert the finger carefully and explore the lower portion of the passage. If the egg is now detected, a little patience will remove it. If out of reach, continued injections of the oil will as a rule assist. Sometimes it is necessary to use forceps, but this requires experience. Having removed the egg, syringe the passage again with warm oil, to which a few drops of carbolic acid have been added, and administer 20 to 30 grains of sulphate of magnesia in a pill. Keep the bird quiet for some days and feed sparingly on bread and milk. Hens often become egg-bound through getting too fat, therefore reduce the quantity of food to such hens, and if possible throw them off laying. In the case of old birds, protusion of the oviduct is often an after-effect, and may be treated as follows:—The protrusion should be gently returned, and astringents such as a weak solution of alum, chloride of zinc, or vinegar and water, or even cold water afterwards applied. Laying must of course be checked, and a careful watch kept on the patient. Inflammation of the oviduct may be suspected if a hen lays soft-shelled, or misshapen, or rough-shelled eggs, and sometimes the yolks are dropped without any covering. Many deaths occur from this malady, which may also result from the continued laying of double-yolked eggs.

Diarrhœa in poultry is the result of improper feeding, and also of allowing the drinking water to stand in the sun. The drinking water should always be fresh and pure, and kept well shaded and as cool as possible. In some cases it is associated with liver disease, when the evacuations will be greenish and bilious-looking, otherwise the symptoms are the frequent evacuation of loose or liquid feces, usually of a watery, frothy character. To treat successfully proceed as follows:—Give a bolus twice or thrice a day of powdered charcoal, a few grains of cayenne, flour, and butter (this is especially recommended by Mr. J. Maude); or give a teaspoonful of olive oil, followed by five grains of rhubarb and ten grains of carbonate of soda, or a grain of opium. From three to six drops of chlorodyne or painkiller in a tablespoonful of water is also frequently used with success. In severe cases, a pill containing one grain each of opium and tannic acid is effectual. During the attack feed sparingly on soft food without vegetables.

Scaly leg (*elephantiasis*) is seen in the majority of poultry-yards, and is very objectionable: it is due to deficiency in the secretion of the oily product of the skin, causing it to become dry and split up. Scrub well with a brush and hot water and soap, and then dress with strong sulphur ointment to which a few drops of oil of tar may be added; or sulphur 1oz., oxide of zinc  $\frac{1}{2}$ oz., oil of tar 1drum., whale oil 2ozs. Apply daily.

There are a good many shows still to be held in the country, and all birds exhibited should be shown in the best possible condition. While it may not be absolutely necessary to wash the birds, at any rate the legs and feet should be clean and free from scale, and the comb, face, and wattles well washed and brightened up with a little kerosine and oil, which must afterwards be carefully wiped off. As the weather gets warm, a sharp lookout must be kept for vermin. It does not pay to feed vermin, for that is just what it amounts to; young stock will not thrive nor hens lay, if infested with lice and ticks. Have no more woodwork about the roosting-houses than is absolutely necessary; to the perches apply a liberal quantity of kerosine, allowing it to run into any cracks that may exist. Do not apply kerosine to sitting hens, the embryo will perish in the eggs. If the houses are properly constructed of iron, all apertures may be closed, and the whole well fumigated with sulphur, which soon destroys vermin of all sorts.

## THE ENGLISH HOUSE SPARROW.

Miss Eleanor A. Ormerod, F.E.S., has kindly forwarded copies of a comprehensive leaflet upon the subject of the English house sparrow (*Passer domesticus*), written and compiled by herself and Mr. W. B. Tegetmeier, M.B.O.U., who seem to have officially consulted all European and American authorities, and read all scientific literature upon the subject. Hundreds upon hundreds of sparrows have been killed and dissected in each country by specialists engaged in investigating the habits of these pestiferous birds, and the conclusion seems to be unanimous that the English sparrow is an unmitigated evil wherever it has found a footing. Not only does it not destroy injurious insects, but it mobs and drives away nearly every bird which eats such insects. Quite 75 per cent. of the sparrows' food consists of grain and seeds, and not 5 per cent. of insects, while the greater portion of those few insects eaten are either such as are quite harmless, or such as are actually beneficial through preying upon insects which injure cultivated crops, &c. During fifteen years one investigator pursued his inquiries, killing sparrows every week and examining the contents of their stomachs, classifying such insects as were occasionally found, and identifying the seeds and vegetables found therein. A report by specialists engaged by the United States Board of Agriculture occupied 100 pages, giving the results of several years of close observation of the food and habits of this bird. In England the annual damage inflicted by the house sparrow upon farmers' and gardeners' crops is estimated at two million pounds (£2,000,000). It has been shown that these birds prefer seeds and grain to all other food, but will eat and destroy buds of all kinds of fruit-bearing trees and plants, young tops of peas, radish, cabbage, cauliflower, sprouts of young barley, lettuces, mangold, beans, &c., berries and fruit of all kinds, and sometimes eat a few insects and their larvæ. The young birds are fed to a small extent upon insects, some of which are beneficial or harmless.

## THE BEEHIVE.

### NOTES AND HINTS FOR NOVEMBER.

By ARIS LIGUSTICUS.

During the past few weeks there has been a fine flow of honey, and all colonies should now be in good condition. As this is a favorable time to practise some artificial method of increase a description of a practicable method will be in season. There are many experienced beekeepers who advocate leaving all such operations to the instincts of the bee, thinking that the more they conform to its habits when in its wild state the more successful they will be; but against this argument there is the fact that under the modern system of beekeeping the whole object is to stimulate the natural energy of the bee, so as to get the best results from its labor, and therefore the conditions are quite different to those that obtain when the bee is in a wild state. In apiaries where the beekeeper is in constant attendance it is a question whether natural swarming would not give better results than what is called artificial swarming, but where the beekeeper is away from his hives during the day it is absolutely necessary to adopt some system of artificial increase. There are many plans recommended, but they all have the same object, namely, to convert one colony of bees into two colonies. It is important that the colony to be manipulated is in the proper condition; it should

be strong and healthy, and there should be an abundance of brood in all stages of development. If the hive is well filled with bees and pieces of new comb are being built at the edges of the frames, such a colony is just right for dividing. The following plan has been followed for many years with marked success:—Take a new hive, and place it on the ground at the back of the old hive containing the colony to be operated upon. Smoke the bees slightly, and open the old hive. Lift the frames up one after the other until the queen is found; put the queen in a cage, and place the cage at the entrance of the old hive. Select a comb containing mostly eggs and unsealed brood; lift this out carefully, so as not to shake off the adhering bees, and place this comb in the new hive. Now take out from the old hive all the combs that contain unsealed brood, shake and brush the bees off these combs so that they may get back to the old hive, and place the combs in the new hive; arrange the combs snugly at one side of the new hive, and put a division board, or, what is better, an empty comb, against the outside brood comb, so as to economise the heat. Close up the two hives, release the queen, and let her run into the old hive; then remove the old hive to a new stand, and place the new hive on the old stand exactly in the same position previously occupied by the old hive. This completes the operation, and if it has been properly carried out there will be the old hive on a new stand containing sealed brood combs, most of the young bees, and the queen; and on the old stand a new hive, with unsealed brood combs, most of the old bees, but no queen. In the evening of the third day after this has been done a laying queen should be introduced to the queenless bees in the new hive by smoking them and letting the queen run in at the entrance. As soon as the bees in both hives have settled down under the new conditions frames containing full sheets of heavy comb foundation should be placed in between the combs as fast as the bees can work on them until both hives have the complete number of frames. The object of using full sheets of foundation is to prevent any drone comb being built.

*Foul Brood.*—At this time of year a sharp lookout should always be kept for foul brood, and if the slightest trace is seen in any hive it should at once be closed and marked in some conspicuous manner. The hands of the bee-keeper, the smoker, and any other implement that has come in contact with the infected colony should be at once disinfected by sponging them with a solution of one part of pure carbolic acid in 200 parts of water, so as to prevent spreading the disease to other hives. Foul brood can be easily got rid of if energetic and thorough means are at once adopted, whereas, if neglected, this disease is very difficult to eradicate.

The following is Mr. Muth's method of cure, which has proved most successful in South Australia, viz.: Remove from its stand the hive containing the diseased colony, and put in its place a clean hive with starters of foundation in all the frames. Brush the bees into the clean hive and feed them with honey or sugar syrup, adding to every quart of food an ounce of the following mixture, namely, 16grs. salicylic acid, 16grs. soda borax, 1oz. of water. This feeding should be kept up for at least one week. The diseased combs should be cut from the frames and burned, and the hive and frames scraped and well scrubbed with carbolic soap and water. Whilst the disease exists in the apiary the apiarist should make a practice of always washing his hands, smoker, &c., with the above-mentioned carbolic acid solution before going from one hive to another.

The following is Professor McLain's recipe and treatment for the cure of foul brood in bees:—*Recipe:* To three parts of soft water add one pint of dairy salt. Use an earthen vessel. Raise the temperature to 90° Fahr.; stir till the salt is thoroughly dissolved; add one pint of soft water, boiling hot, in which has been dissolved four tablespoonfuls of bicarbonate of soda; stir

thoroughly, while adding to the mixture sufficient honey or syrup to make it quite sweet, but not enough to perceptibly thicken; to  $\frac{1}{2}$  oz. of pure salicylic acid (the crystal) add alcohol sufficient to thoroughly cut it (about 1 oz.), and add this to the mixture while still warm, and when thoroughly stirred leave standing for two or three hours, when it becomes settled and clear. *Treatment*: Shake the bees from the combs, and extract the honey as clearly as possible. Then thoroughly atomise the combs, blowing a spray of the mixture over and into the cells, using a large atomiser, throwing a copious spray; then return the combs to the bees. Combs having considerable quantities of pollen should be melted into wax and the refuse burned. If there is no honey to be obtained in the fields, feed syrup or the honey which has just been extracted. If syrup is used add 1 oz. of the remedy to each quart of the syrup fed; if the honey is used add  $2\frac{1}{2}$  oz. The honey and syrup should be fed warm, and the remedy thoroughly stirred in, and no more should be furnished than is consumed. Continue the treatment by thoroughly and copiously spraying the diseased colonies at intervals of three days, simply setting the frames apart so as to direct the spray entirely over the combs and bees. In order to keep the bees from bringing in fresh pollen burn old dry bones to an ash, pulverise in a mortar, and sift through a fine wire cloth, and make a mixture of rye-flour and bone-flour, using three parts of rye-flour to one of bone-flour, adding enough of the syrup or medicated honey to make a thick paste. Spread this paste over part of one side of a disinfected comb, pressing it into the cells with a stiff brush or a thin honey knife, and hang this in the hive next to the brood. Continue this treatment until a cure is effected. Keep sweetened brine at all times accessible to the bees, and continue the use of the rye and bone flour paste while the colonies are recuperating.

## NOTES ON VEGETABLE-GROWING FOR NOVEMBER.

BY GEORGE QUINN.

Continue to make sowings of melons of all kinds, carefully mulching over the surface of the spot with finely-broken manure for about an inch in depth. As the season is advanced on the plains country, every effort should be made by watering carefully to hurry these later sowings on. Any plants of water, pie, sweet, or rock melons, cucumbers, gourds, squashes, marrows, pumpkins, trombones that may be on hand in pots should be transplanted out as soon as convenient, either selecting a cool change or in the evening for the work. They should be mulched and shaded at once. If allowed to remain in pots after the rough leaves develop they become stunted, and very subject to the attacks of thrips or aphides.

The secret of success in growing all cucurbitaceous plants lies in keeping them growing strongly right through. Where cucumbers have reached the running stage nip out the points to cause them to branch freely. If growing in an exposed position peg the trailing shoots of all of these plants down. Young switches from almond or plum suckers make good pegs.

Successional sowings should be made of beans, dwarf, and runner, red and silver beets. Lettuces, radishes, and cress may still be sown in cool, moist, shady situations. These are best sown thinly, mulched well, and grown on where they germinate.

The harvesting of potatoes and onions on the plains will be in full swing, and a good rain could benefit both of these crops yet. Potatoes should be stored or marketed at once, or in a season like the present the destructive caterpillars

of the potato moth (*Lita solanella*) will cause damage. Onions must be handled carefully and, if gathered as soon as the tops wither down, that is, before the bulbs are exposed to sun scald, they will keep a very long time indeed. This is a quality to be sought in onions, for in very early-maturing or late-keeping varieties there is profit for the grower.

Tomatoes should be growing strongly and do well with mulching and water. They should be as far as practicable staked up off the soil. The common bamboo reed makes good stakes. It is a moot point as to whether fruits near the warm soil do not ripen more evenly and quickly, but at the same time great numbers are spoilt by contact with the earth, and the shade of prostrate plants seems to be conducive to the conditions necessary for the development of fungus diseases.

All the summer vegetables mentioned in these notes will be greatly benefited by applications of liquid manure, made by putting a spadeful of bonedust, or guano, or a larger quantity of sheep or cow manure into a sack, and steeping it in a tub or tank, drawing off only the liquid afterwards. In the deep wet gullies in the cool hilly districts make sowings of the vegetables recommended for last month.

Asparagus beds should be allowed to grow as much as possible now to store up strength for the production of stems next season. It is a good American practice to sow a dressing of three quarters muriate of potash and one-quarter nitrate of soda—say about 30lbs. of the former and 10lbs. of the latter per rod of ground occupied by the bed, and gently work it into the soil, and if possible apply a watering.

## NEW DISEASE OF CAULIFLOWERS.

Early in October Mr. W. E. Maddern, of Auburn, forwarded to the Agricultural Bureau office samples of cauliflowers attacked by some disease. The stems and roots become of dark color, the green substance perishes, leaving the fibrous matter exposed. The plants fail to mature any head and become quite brittle. Mr. Maddern stated that fully 50 per cent. of the plants were affected, half of them being very bad. Cabbages alongside were not attacked. Specimens were submitted to Professor D. McAlpine, Vegetable Pathologist to the Victorian Department of Agriculture, who reports that the disease is caused by a very injurious fungus, there being numerous small black pustules on the roots, which he determined to be a new species of *Phoma*, and which he suggested should be called "Root-rot of the cauliflower," as it has much in common with the root-rot of the beet. He believed they had a similar disease in Victoria, where it was known as "black-legs." Although the cabbages had so far not been attacked, he regarded it merely as a matter of time before they would, and recommended the following remedial treatment:—Remove and destroy all diseased plants; rotation of crops, care being taken not to grow any of the cabbage family; saving seeds from healthy plants, and testing varieties for the purpose of ascertaining whether some kinds will not resist the disease. Whatever encourages strong healthy growth, such as good drainage, &c., will also check the disease.

**CARTING OUT NEW MANURE.**—At Ottawa Experiment Station (Canada) 3,000lbs. stable manure, turned over once a month for eight months, was reduced to 1,600lbs. Eight years of experiments proved that manures carted out at once and worked into the soil gave equal results, ton for ton, with manures that had been prepared by keeping and turning, so that by using the manures at once, more than three times more benefit accrues to the soil, and all the labor in "making," turning, &c., is avoided.

## ORCHARD NOTES FOR NOVEMBER.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

The principal operations for this month will be cultivation, budding, thinning fruit's, watering, disbudding to shape young trees, transplanting citrus trees, gathering early fruits, and fighting fruit pests. This is truly a comprehensive order, but covers nothing more than is done in every well managed orchard.

Cultivation is covered by the stirring of the soil should a shower fall, or water be applied artificially.

The object is to checkmate the capillary action which is constantly being set up, and thus prevent the leakage of moisture by evaporation; and to do this to the greatest advantage the soil should not be turned in summer, but simply stirred, the object being to keep a shallow mulch or covering of dry pulverised soil on the surface. That this finely-pulverised covering of dry soil will have the above effect can be easily tested by trying to cause water to soak rapidly through a mass of dry fine dust.

Budding is dealt with in a separate article, and will not be discussed here, beyond saying that now is a very good time to put in buds in citrus trees.

The thinning of apricots, peaches, and nectarines is a necessary work. The crop of apricots promises to be large this year, and as the crop was good last season the grower who thins and saves his trees from carrying a great load this year will probably be rewarded next, as it must be borne in mind that these trees are not likely to make good fruit wood for next season after two heavy crops of fruit in succession.

In thinning apricots consider the above point, and the general health and capacity of *each tree*; for what would be a suitable quantity for a healthy vigorous tree, would stunt and temporarily ruin a less thriving specimen.

Peaches and nectarines are more saleable when large, well shaped and colored; consequently each fruit requires room to develop to a proper shape and size, and enough light to give color. The same remarks about the health of each tree will hold good as with the apricot. To give a rude guide for the use of the amateur in thinning I would say allow each peach 6in. of twig if extra fine quality is required. Nectarines require about 4in. each. Where a number of fruits seem to have equal claims to be left, retain those on short stout fruit spurs, and if growing underneath the spur all the better, as they are less liable to be knocked or blown off.

Early in the month a good watering will vastly improve all stone fruits, as the rainfall has not been sufficient to properly saturate the soil in the past winter. Young recently-planted trees will be greatly benefited by a good watering about once a month. Open out a ring around each tree a little wider than the spread of the branches. After the water has soaked away replace the earth and hoe or fork up the surface again. Young trees are for the first summer greatly helped if a mulch of manure or litter can be spread over the soil as far as the spread of the roots.

Citrus trees may yet be safely transplanted if ordinary care is taken. This subject was dealt with fully in September issue.

The disbudding of young fruit trees for the proper formation, and to assist the growth of the leading shoots, is discussed in a separate item in this journal.

The harvesting of loquats will be brought to a close, and, should time permit, all dead wood and old fruit stalks may be removed from the trees to allow for a clean, open start when growth begins.



Early cherries will come in, and can be improved by a good application of water.

The harvesting of strawberries will be in full swing, and it is to be hoped that more of our growers will use the light wooden punnets or berry boxes for the purpose of carrying these to their customers in a sound attractive condition, with the bloom still on them. Those who have taken the precaution to cover the surface of the ground around the plants with straw or seaweed will now be able to gather fruits free of grit and sand. For the last two or three seasons there has scarcely been any second crop of strawberries owing to the want of a good soaking rain just at the critical time of filling out the berries. There are suitable spots for dams near many strawberry gardens, and the question of irrigation should be considered. A good dam of surface water caught in winter would supply the one soaking needful to mature the second crop.

The cutting of lemons should be done just when they are beginning to turn yellow, if they are to be stored. In dry weather a week in a well ventilated store or shed will wilt the moisture sufficiently to toughen the skins. Each fruit should then be wrapped in a separate piece of tissue paper, after which the lemons are packed carefully in boxes and stored in dark cool cellars or storerooms built within other structures. If a difficulty arises in keeping the temperature down, admit plenty of cool fresh air, at night only.

The fighting of insect pests is an important item now. Peach aphid is exceedingly troublesome this year, and I wish to repeat the statement made in previous issues that to suppress this species the applications of tobacco and soap spray must be repeated several times, at intervals of about forty-eight hours, until the pest is suppressed. I have recently made experimental tests in fumigating for this pest, and find that 6ozs. of refuse tobacco, well damped and smouldered away on coals in a pot beneath a close tent spread over the tree, if left about thirty minutes, will kill nearly every insect on a tree 8ft. high and about the same spread of branches. A tree of a similar size was treated with equal success with hydrocyanic acid gas when confined fifteen minutes, using 1oz. potass. cyanide 98 per cent., 1oz. sulphuric acid, and 3ozs. water. The young larvæ of black scale should be destroyed with resin wash sprays, given at intervals as fresh batches of young insects are noticed.

Spraying with Paris green (Blundell's) at the rate of 1lb. to 150galls., with 1lb. of fresh lime slaked and added to each 10galls. of the mixture, should be given fortnightly by those who wish to thoroughly test the efficacy of this remedy here for the suppression of codlin moth.

Bandages should be placed around all apple, pear, and quince trees, and any other trees near these sorts. A good bandage is made of a strip of old sacking just long enough to go around the stem and overlap about 1in., and about 8in. wide. It should be doubled, and the folded side placed upwards. If a 2in. wire nail be used as a pin—not driven into the tree—time will be saved in making the weekly examinations.

If the orchard is cultivated the soil should be completely pulverised around the sorts subject to the attacks of the codlin moth larvæ, and stirred frequently during the summer to prevent larvæ entering the clods and hatching out from thence.

If soldier bugs become troublesome on the young orange trees, by destroying in their well-known way the young tips of the sappy shoots, go out in the early dewy morning, or on a cool cloudy day, when they seem loth to fly, and brush them to the ground, when they can be quickly crushed. The aphid of the orange tree is much paritised by a minute fly this year, and before using any dressing examine the aphides for the presence of brown dry bloated specimens. If they are numerous do not bother to use the spray.

## DISBUDDING TO FORM YOUNG FRUIT TREES.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

This is one of the operations covered by the term "summer pruning," and is a very good instance of the error of calling all manipulation during the growing period by this name, as this one is performed in the spring. The object for disbudding in this manner is to secure an even distribution of the main branches upon the trunk. When a young tree from the nursery is cut back to a single stem in winter it will during the next spring send out a lot of shoots along the stem, as seen in Fig. 1.



FIG. 1.



FIG. 2.

The height of the main stem is about 20in., and the tree is the American canning peach, "Muir." The photograph is somewhat misleading as regards the height of the stem. The shoots that have been broken off (see Fig. 2) were all within 12in. of the ground, and the length of the stem upon which the remaining growths are left is between 8in. and 9in. On this space five shoots are left to form main branches, and it may be argued that these are too close together. Such would be the case if they were on an apricot, and the danger of ultimate splitting off would be great, but with the more tenacious peach the point is not so important.

It is often stated that breaking away these shoots causes the remaining ones to take the strength that would go into them. If the growth and strength of a tree is in direct proportion to the leaf surface, and the leaf surface being reduced abruptly, the growing or assimilating powers of the plant must be checked at once, so that this generally-accepted statement is only half a truth.

But disbudding to form main arms is desirable because it frequently happens, as will be seen with one of the lower shoots on Fig. 1, an undesirable branch is likely to outstrip those required to give the tree a properly-balanced head. Therefore if the shoots not necessary to form the head are rubbed out now the wounds will heal up, and careful manipulation will, while only giving slight checks to those remaining, gradually regain and maintain a comparatively even balance among the shoots preserved to shape the tree. If the figures are examined closely it will be seen that the topmost growth on the right hand side is outstripping all the others, and this illustrates the treatment necessary from time to time, during the growing period. The point of such a dominant shoot should be pinched out (see Fig. 2) on an outward bud. This will check its growth for a short time, and in the meantime the lower and weaker ones will regain lost ground. It may be necessary to do this several times to different shoots during the growing season should they begin to outstrip the others; but unless this uneven growth occurs no pinching should be necessary during this season.

A tree shaped like our illustration will have a main stem from 10in. to 12in. high, five main arms radiating out around the stem at equal angles, and the foundation is laid for a good sturdy tree in the future.

## BUDDING PLANTS.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

Budding may be described in short as a form of graftage by means of one bud. It has several advantages over other forms of grafting, the principal one being that the whole of the inner face of the inserted portion comes directly in contact with the cambium layer or growing surface of the stock, causing a more rapid union and a more consistent fusion of the tissues of both scion and stock, thus allowing less opportunity for inert matter to be left within the enclosed space. The preservation of scions for a lengthy period is not necessary, as is the case in grafting, and, what is very important to the nurseryman when in possession of a new variety, budding opens a means of propagating a much greater number of plants from a small quantity of wood. The chief points to remember in performing the operation are:—(1) The sap must be flowing freely in both the stock and plant from which the buds are to be taken. (2) the root action of the stock must be good and healthy: (3) the work of cutting the bud, opening the bark of the stock, inserting and trimming the shield containing the bud must be done cleanly and rapidly, to prevent the sap drying or any bruising being done: (4) the binding must be complete and firm, but not too tight; (5) the buds must be carefully watched to loosen the ties before any constriction of the stock occurs; and (6) the stock should not be cut back short at the time of performing the operation.

In South Australia budding is performed at any time in the spring or summer, when the sap is active, but it is not always convenient to obtain suitable buds early in the spring; therefore it is generally well into November before these are procurable from many plants. In an ordinary garden, where no general preparations are made for propagation, plants may be budded in spring, but in nursery work, with the exceptions of roses and citrus fruits, most of the budding, for reasons to be explained later on, is done in late summer.

If, we will say, an apricot, peach, plum, apple, or pear tree is to be worked over by budding in an orchard the owner will most probably have cut the tree hard back in the previous winter, the result of which will be a strong growth of young shoots, and as soon as buds of the desirable sort are procurable in the

spring the operation may be performed with hopes of getting fine vigorous growth from them in the summer. In such instances early budding is desirable; but if this cannot be assured it is best to postpone the work until later on, as a weak growth from a bud the first season is not desirable, and it is a generally-accepted fact that the growth from a dormant bud will outstrip that from a weakly start of a previous season.

The general application of budding to the propagation of fruit trees in nursery work here is as follows:—The stones of peach, plum, cherry, almond, and apricot, and the pips of apple, pear, and oranges, &c., are sown as soon as they are taken from the fruit, and this necessary precaution practically rules the time for budding. Apricots and almonds germinate more rapidly, con-



PLATE 1.

sequently the young trees may be ready to receive the buds before Christmas and make growth the first year; but peaches and plums are slower, consequently they are not ready until late summer and therefore, the buds will remain dormant until next spring. Apples are root-grafted on to blight-proof stocks in early spring; consequently they will not be suitable for budding until late summer, &c., &c. The stocks to be operated on should not be less than  $\frac{1}{2}$  in. in diameter, and, for easy and rapid manipulation, should be  $\frac{3}{4}$  in. thick. The leaves are trimmed off the stock for the space of 3 in. or 4 in. at the space to be worked; the height to insert the buds on the stem varies.

Apples on blight-proof stocks should not be budded less than 6 in. from the ground, and 9 in. will insure greater immunity from the development of adventitious roots, thus reducing the possibility of the object of using this

stock being defeated. Taken generally, other fruit trees should be budded quite close to the ground, as then the elbow formed by cutting away the upper portion of the stock later on is less marked. The buds are taken from fresh growths of the same season, and the middle half of a "switch" usually carries the best-developed and active buds. With the orange family it is often necessary to go a little nearer to the base of the shoot to secure buds on round wood, the upper ones being extremely angular and awkward. When the "switches," or budding sticks, are cut each leaf blade should be cut off leaving only the petiole, or leaf stalk, as shown in Fig. 1 of Plate 1. These sticks of buds are wrapped in wet bagging or moss and kept away from the sun or dry wind, as if slightly wilted they toughen, and are almost, if not quite, useless. The leaves should not be stripped from the stock at the point of the



PLATE 2.—CUTTING THE BUD.

insertion of the bud more than a few hours before the budding is done, as the bark tends to harden and become tenacious at the spot after a few days. The incisions on the stocks should all be on the same side as far as practicable, the south side being preferable. This similarity of position facilitates finding the buds when searching for misses, &c. Make the vertical incision about an inch long, drawing the knife upwards. Then by pressing the blade across the top of this cut from left to right with a slight motion downwards and outwards, the bark will be started from the stock, and if the sap is very free no further opening is necessary to enable the bud to be pushed in; but if the bark is not easily parted the bone end of the knife handle must be used to ease the bud into position. This is shown in Fig. 2 of Plate 1.

Plate 2 shows the method of cutting the bud. The stick is held in the left hand, with the buds pointing down, and starting with the base of the blade—which must be exceedingly sharp and thin—about  $\frac{3}{4}$  in. on the upper side, draw

it quickly down, without any sawing motion, taking off a thin slice of bark, with cambium adhering beneath, until the bud has been passed; then it may be pulled off, with a strip of bark attached, or cut out say  $\frac{1}{2}$  in. below the bud. If the last bud on the lower end of the stick, as held in our illustration, be cut off first, this tearing motion does not injure the other buds, and it is vastly quicker than cutting out each bud.

Some operators prefer removing the cambium layer from the shield, and this should be done by holding the bud (Fig. 2) firmly between the thumb and first finger of the left hand, loosening the cambium layer at the top of the shield—above the bud in its natural position—and with a kind of upward jerk remove it, leaving the small bud in the cavity behind the face of the bud point.

Unless a thick slice be taken or a bruised section be made there is really no need to remove this cambium, and its presence stiffens the shield and facilitates pushing it down the matrix. When it is pushed down, so that the base of the shield is held firmly beneath the bark at the bottom of the vertical incision, the protruding bark (Fig. 4) is cut off cleanly at the horizontal cut of the matrix, and the bud is inserted ready for tying, as shown in Fig. 5. Figs. 6 and 7 show two methods of tying. Of these I prefer the first. The tying material—soft candle cotton is most suitable and cheap—cut to strips about  $1\frac{1}{2}$  ft. long, is taken in both hands. The middle is resting on the base of the bud matrix; then with a rapid alternate crossing action the binding is put on firmly, allowing the petiole and bud to protrude, and is continued until the matrix is all covered, when a simple hitch or slip knot is formed on top.

The second method is American in origin; the first turn encloses the lower end of the binding material, which is then wound around the stock, allowing the petiole and bud to protrude, and is continued above, enclosing all the incisions, after which a slit is made in the stock well above the bud, into which the top end is fastened, as is done with reels of sewing cotton.

In two or three weeks the buds should be examined. If the petiole, or leaf stalk, on being bent back parts from the bud shield readily the buds are usually secure and taken, but if the leaf stalk is tough, and will not separate without force, the bud has generally missed, and is dead. If the buds are safe the ties should be cut or the knots broken to allow the binding to be readily pushed away as the stock gradually swells. When budding has been performed late in the season there is less urgency for this, but early buds must be attended very closely, or they will be cast off. Stocks into which buds have been placed in spring, and from which good growth is made at once, should be cut back gradually as the desirable shoot lengthens, using the old stump above the growing shoot as a support to which the tender growth is tied. Stocks budded later, and on which the buds remain dormant, should not be cut back until the next winter pruning season, when they will be cut off down to the bud.

For the excellent illustrations of the methods explained herein I wish to acknowledge my indebtedness to Mr. Ernest Gall, of this city, who has taken great pains to reproduce what I think most of the readers of this journal will admit are splendid reproductions of the original specimens.

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## HANDLING LEMONS AND ORANGES.

The following practical hints, formulated mainly by the Advisory Board of Lemon-growers, who are affiliated to the Southern California Fruit Exchange, have been published for general information. Assuming that ordinary care is given in the way of irrigation and cultivation, and the fruit is ready to be gathered:—

1. Have pickers' nails trimmed short. Few will believe how much fruit goes as "culls" from damage by long finger-nails.

2. Clip the fruit close to the stem.
  3. Do not use sacks to gather. Lemons are thereby bumped and bruised with every movement of the body. Use baskets lined with sacking.
  4. Do not bundle fruit from the basket into boxes, but handle lemons as you would eggs from start to finish.
  5. Never pick when there is moisture from fog, and wait at least four or five days after rain or an irrigation.
  6. Place all filled boxes on the north [south in Australia] side of the tree, and shade closely from the sun.
  7. Go over trees once every four or five weeks, and thus save sun-burned and over-sized fruit, all of which goes as a third-grade fruit, or is more frequently thrown out.
  8. Pick in winter months to a uniform size of 2½ in. in diameter, and in summer months to a uniform size of 2 in. Metal rings for this purpose can easily be made.
  9. Loaded wagons should never be allowed to trot or bump over ploughed furrows, ditches, or chuckholes.
  10. If dirty fruit has to be washed, let this process be got over quickly, and to employ the largest possible gang to this end will save the fruit immensely. During all undue exposure the work of deterioration is rapidly progressing. Here, again, avoid all dumping of the fruit, and look to washers' nails.
  11. If fruit has to be taken to depôt or central parking-house, let it be done in summer, during the cool of the morning or evening.
- The grower, in following out such suggestions, has then done his level best. A responsible curer, packer, and a good market will do the rest.
- The above applies equally to oranges in their separate treatment. There would be fewer complaints of fruit arriving at its journey's end "heated," &c., if growers were more particular with regard to handling.
- It has been specially noted, for instance, by the exchanges, that serious damage has ensued from gathering oranges too early after a heavy rain, and in many districts the "washing and scrubbing" system has been added to the already soft and soddened fruit conditions.
- Growers will find in course of time, and probably after some more grievous lessons, that until the washing and scrubbing business has been entirely done away with, and trees fumigated for black and other scales, their fruit can never be first class. Fumigation pays for three years' washing, and 500 per cent. into the bargain.

## THE HYDROCYANIC ACID GAS TREATMENT FOR DESTROYING SCALE INSECTS.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

With a view to testing the efficacy of this invention of D. W. Coquillett, of the Department of Agriculture, Washington, U.S.A., for destroying the red scale of the citrus tribe (*Aspidiotus aurantii*), I began a series of experimental tests in August, 1896, in the orangery attached to the Adelaide Lunatic Asylum. Two tents were used. The largest one measured 16ft. high, 14ft. in diameter at the base, and 6ft. in width at the top, and was made of fine linen duck. The small one was 5ft. high and 3ft. in diameter. Both were coated with a mixture of boiled linseed oil and Indian red, rubbed into the fibre with a rag. Three rubbings were given to each side, each coating being allowed to dry before the next was rubbed in. This work covered a period of about four weeks.

The large tent should not be narrower at the top than bottom, and a tent 16ft. high by 14ft. in diameter all the way up, ready dressed for use, would

cost about £8 10s. A  $\frac{1}{2}$ in. gas-pipe ring was bent cold to form a circle to fit around the bottom. The ends were jointed by bending a piece of larger piping 1ft. long, into which the ends of the gas-pipe were pushed. Holes were then drilled through the covering piece and the inner tube, through which short pieces of fencing wire were thrust and bent around to secure the ring. This joint can be seen near the hand of the figure on the right hand corner of Plate 1. This ring costs about 7s. 6d. The rim was fastened with short cords inserted through brass eye holes near the bottom of the tent.

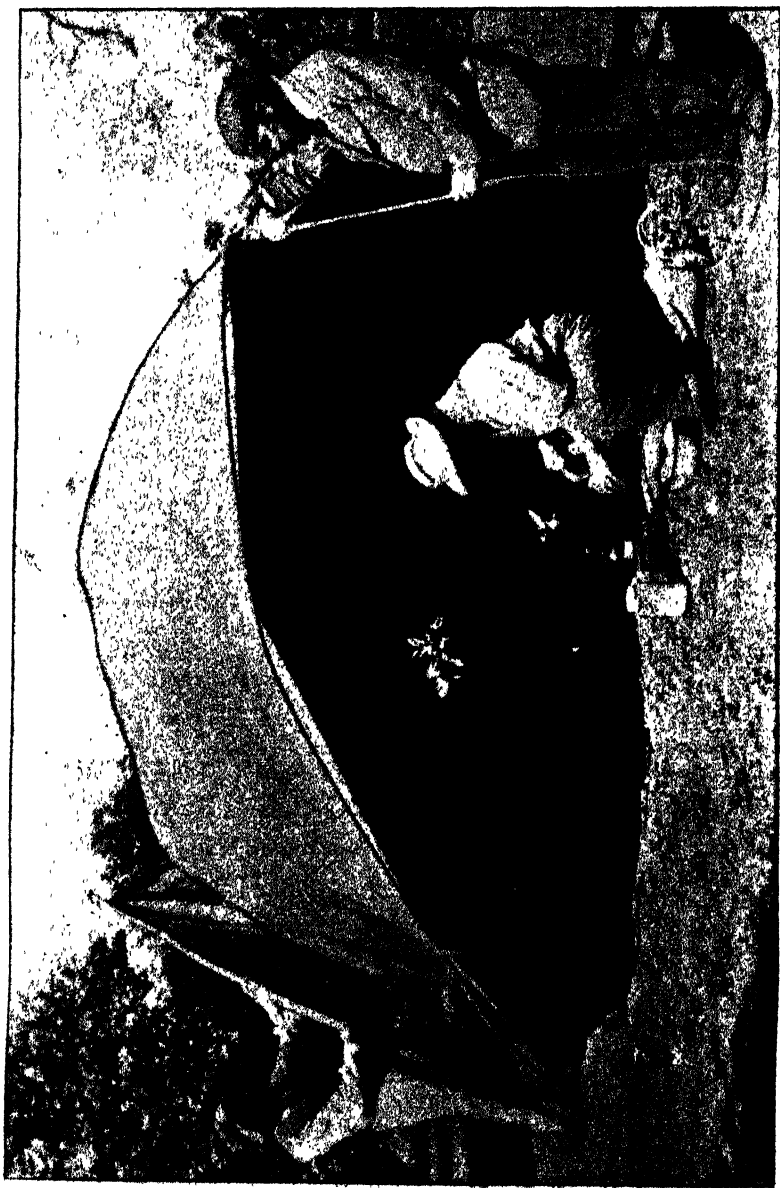


PLATE 1.



When about to operate the tent was drawn up to the side of the first tree in a row, and turned with the open end towards the tree, the inner portion of the ring as it lay upon the ground being just beneath the foliage. To facilitate working, a light rope was tied to the outside margin of the hoop, and thrown over the tree. One man then held the ring on each side, and a third held the rope. As the outside edge of the rim was raised towards a vertical position, the rope was pulled firmly, thus drawing the rim over the top of the tree. As the weight passed a vertical line, one of the rim-holders, being relieved of



PLATE 2.

weight, took a pole and eased the canvas over the foliage as seen in Plate 1. Then with a gentle pull on the opposite side of the rim the tent fell all round into the position as seen in Plate 2.

Trees up to 13ft. in height and 13ft. in diameter at the base were enveloped in this manner by three men in five minutes. While the chemicals were being portioned out a little earth was thrown on the edge of the canvas for about two-thirds of the circumference. The chemicals were used at the rate of 1oz. potassium cyanide 98 per cent., 1oz commercial sulphuric acid, 3ozs. water to



PLATE 3.- REMOVING TENT.

about each 200 cub. ft. enclosed. The acid was first poured into a glazed earthenware bowl, as shown in Plate 1. The water added carefully, and then, one side of the rim being raised, the bowl was placed underneath the tree near the stem. A piece of damp sacking was thrown over the top of the bowl. The cyanide having been placed in a tin, the operator crawled underneath, lifted the bag, poured the lumpy cyanide into the bowl, dropped the bag over it to prevent the tent or foliage being spattered, and at once backed out of the tent, which was closed down by throwing soil on the remaining margin. The tree is confined from forty to fifty minutes, according to the density of the foliage, &c.

The American operators suggested pouring the acid in last, but there is great danger of it spurting when used in fair quantities, owing to the sudden evolution of heat caused by coming into contact with water, and as it does not run rapidly from the measure the first portion would cause the deadly gas to begin to evolve before it could be emptied. When the time of enclosing has passed the rope is changed around to the opposite side of the rim, the earth shaken off the canvas margin, and the tent turned inside out over the next tree in the row, as shown in Plate 3. For larger trees a derrick was used for operating the tent, but was found too cumbersome for practical purposes. In Plate 4 I give a device for use upon large trees, and give the description *verbatim* and plate as shown in the "Biennial Report of the State Board of Horticulture of California for 1893-4":—"The illustration is one of the Los Angeles outfits at work in Covina orange grove. The two poles or uprights are of dressed Oregon pine, 2in. by 4in. and 24ft. high. Across the bottom of the poles are bolted—one on each side—two pieces, 1in. by 3in. and 6ft. long. From each end of the cross piece a brace, 2in. by 4in. and 4ft. long, is fastened to the upright pole. The cross bar prevents the pole from falling sideways when raising the tent over the tree. A 3in. guy rope, 33ft. long, is fastened at the top of each pole in front. A 4in. block is fastened in the rear at top, and another block where the braces join the uprights; through these is passed a 3in. rope, 70ft. long, to raise the tent. Instead of the rope with rings sewed to the canvas, to which a hook was attached for raising the sheet, the edge of the sheet is gathered, and a hitch with the rope around it makes it fast, so that it can be drawn up. This obviates the necessity of placing the sheet in a certain position and right side up, thus saving a lot of time. When all is ready the sheet is dropped on one side of the tree; the uprights are raised, one on each side; the ropes are adjusted to the edge of the sheet and hoisted; each upright is steadied by a man with the guy rope. When raised sufficiently the men pull on the guys, thus bringing the sheet forward and over the tree. The uprights are allowed to drop to the ground, leaving the tent in position over the tree. In operating take the number of rows of trees and tents that you can adjust within the forty or forty-five minutes required to gas a tree. In this way no time is lost. One set of uprights will answer for all the sheets. The sheets are made octagonal, and sizes are 32ft., 48ft., 52ft. and 60ft. in diameter."

The effects of the gas were tried in strong sunlight, on perfectly cloudy days, on "blinky" cloudy days, and in the perfect darkness.

The trees treated in sunshine were almost completely defoliated, and young shoots killed down quite 2ft. from the points. These trees were allowed to stand until young shoots appeared lower down, when they were cut back below the injured part, and at the present time—twelve months later—they have made growth double the length of any other tree in the orangery, showing conclusively that any error of working would not kill the tree. These trees, however, were not cleared of scales as completely as others done in darkness without scorching even the tender shoots. Those fumigated in cloudy weather were not injured with the exception of some treated in bloom. Of these, the blooms were destroyed; but, though the majority of the "scales" were destroyed, the results were not so absolute as obtained with those treated during the darkness.



PLATE 4.—DERRICK METHOD.

The method of computing the size of a tree adopted by me was to take a bamboo with a scale of feet marked on it, pass it up through the tree to obtain the height. It was then passed through the widest and narrowest diameters, and the cubic capacity calculated therefrom. Of course this is not absolutely correct, but it answers for practical purposes admirably.

The cost of materials for treating an orange or lemon tree 13ft. high and 12ft. in diameter for the first 7ft. from the ground, in September, 1896, was as follows:—

Six ozs. sulphuric acid at $\frac{1}{4}$ d. per ounce .....	0	$0\frac{3}{4}$ d.
Six ozs. potassium cyanide, 98 per cent., at $2\frac{1}{4}$ d. per ounce..	1	$1\frac{1}{2}$ d.
Total.....	1	$2\frac{1}{4}$ d.

Since this, however, the grade of cyanide, which cost me 3s. per pound, can be procured for 1s. 6d. per pound. Thus, the cost of treating the tree of the dimensions given above would now be  $7\frac{3}{4}$ d., which is cheaper than three sprayings with resin compound. These tests were continued at intervals throughout the year, and, judging by the results obtained, I wish to make the following recommendations:—

I would suggest that  $\frac{3}{4}$ in. instead of  $\frac{1}{2}$ in. piping be used in constructing the rim, as it is less likely to warp. The tents should not be narrower at the top than at the bottom. The fumigating should be performed at night, moonlight for preference, to be able to work with greater ease and certainty. The early summer or late autumn are the best times to kill red scales, for then they do not seem so firmly sealed down beneath the puparium, and are more exposed to outward influences. The work of fumigation is of a much lighter, cleaner, more agreeable character, and—as I shall show in a subsequent article—far more thoroughly effective than any spraying compound we at present possess for treating scale insects. The operators do not need to stand idle while the gas is doing its deadly work, and if several tents or sheets were used as suggested in the American article quoted herein the time could be fully occupied. It has several advantages over spraying; the chief among these is that the weather—excepting extreme gales of wind—makes little or no difference. A heavy fall of rain following immediately after spraying spoils the work almost completely, but not so after an orchard has been cyanided.

To illustrate the complete nature of the destruction wrought on the red scales I will instance a couple of badly-infested trees in the orangery of Mr. George Quick, at Marden, which were treated by me on November 13th, 1896, and since then I have not found a living red scale upon them, the crop of fruit this season, 1897, being quite free of the pest. These trees are slightly isolated from other trees infested with this scale. A few words of warning are necessary on account of the extremely deadly nature of the fumes. The gas should never be inhaled, and a rapid exit from the tent is necessary as soon as the cyanide is added to the liquid which contains the acid. When removing the tent stand to windward as much as possible, as the fumes rushing out, though much diluted with air, are sickening and disagreeable in the extreme.

The cyanide should be kept in a close airtight tin or jar, locked away securely stoppered in a cool place, and labelled "Poison." The vessel when opened should be held away from the nostrils to allow the collected gas to escape.

The sulphuric acid must be kept securely stoppered in glass or glazed earthenware jars, and great care must be taken to keep it off the clothes or flesh, and when adding it to water be careful to keep it stirred with a glass rod or spoon; otherwise the spurting may cause injury. After the tent is taken from a tree always rinse out the generating bowl with clean water. In a future article I shall show the comparative costs and results of this and the spraying treatments when used side by side for destroying red "scales."

## CODLIN MOTH TRAPS.

At the ordinary meeting of the Central Bureau, held on October 4th, Mr. Krichauff furnished particulars of glass traps used in Germany for the purpose of catching codlin and other moths. These traps are half filled with syrup, to which a little apple pulp is added, and on fermenting the smell of the apple attracts the moths, which settle on the sticky mixture to lay their eggs, and are destroyed. On inquiries being made, the Manager of the South Australian Glass Bottle Company was kind enough to present to the Bureau six dozen glasses, which they had adapted to this purpose. These were distributed to a number of growers for experiment, besides which Mr. George Quinn, Inspector of Fruit, took a number for trial. He placed a dozen of the glass traps in the orchard of Messrs. Rowell Brothers, at Lockleys, and charged them with syrup made of treacle and water, with a little stewed apple pulp. The traps were fixed in the trees on Monday morning, and by Thursday forty-three codlin moths were caught, besides a great many other moths, flies, and insects of all descriptions. Owing to their being cracked several of the traps had leaked their contents very quickly, and only a few were in a workable condition after the first day. By the third day the syrup had nearly all dried up, and consequently the traps required an addition of liquid. The result proves that the codlin moth can be trapped, but whether the pest was caught before the egg-laying is uncertain, though Mr. Quinn extracted from the body of one moth nine eggs, which shows that at any rate all the eggs had not been deposited. According to different authorities the number of eggs laid by a female varies from thirty to eighty. Just now the moths are beginning to hatch freely. The traps were hung in a scattered manner in pear trees of different varieties, comprising early, medium, and late sorts. In no instance was more than one trap put on a tree. In a trap placed in a Duchess pear tree nine codlin moths were captured. To give the method a complete test it would be necessary, Mr. Quinn says, to hang several traps in each tree, and observe throughout the fruit season whether the caterpillars of the moth were lessening in number. On the whole, the experiment so far may be regarded as satisfactory. It is necessary in this dry climate to recharge the traps every second or third day, and hang them in a shady part of the tree and on the side away from the prevailing winds.

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## THE VINEYARD.

### NOTES AND HINTS FOR NOVEMBER.

*Written for the "Journal of Agriculture and Industry."*

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

### Setting of the Fruit.

November is a most important month to the vinegrower for the expansion and setting of the flowers; it witnesses the birth of the vintage. That the issue of a physiological operation, so pregnant with practical interest, should be under complete control, might be desirable, but unfortunately in the main it is independent of the grower's care and attention. For its success the weather prevailing during the course of this month is, as a rule, almost wholly responsible. Under the influence of heat the flowers expand, and the slightest air-currents suffice to waft the pollen grains on to their delicate moist stigmas, and bring about fertilisation. High temperature acts usually as a stimulant, causing the flowers to expand uniformly and well. Cold wet weather, on the other hand, always reduces the percentage of flowers that are successfully

converted into fruit: the cap formed by the combination of the petals rises with difficulty, and neither stigmas nor stamens are able to synchronously perform their respective functions, to the detriment of the grower. Strong winds, hot or cold, are equally injurious in their action, scattering the light pollen grains far and wide, and desiccating the tender stigmas before the latter can be reached by stray pollen grains. On the whole, calm, warm, cloudy, but rainless days, usually ensure a heavy setting of fruit. Weather of this character obtained in November, 1896; let us hope that we may be equally favored during the present season.

If, however, the main point at issue is in reality beyond the immediate control of the grower, it is still possible for him in various ways to contribute towards its success. There are many vines that, year after year, fail to successfully set their fruit through an excess of vigor of vegetation; this rankness of growth, which induces the fall of the flowers, may with great advantage be momentarily checked by pinching back the growing extremities of the shoots, just as the flowers are bursting. This practice, which is totally distinct from the promiscuous "topping" in vogue in certain districts, often brings to fair fruiting the most refractory of varieties.

Again, the setting of the fruit is often marred by the development on the flowers of parasitic fungi. The oidium fungus is a great sinner in this respect; it may, however, be easily checked by a liberal use of sulphur as the flowers begin to open. When signs of invasion of any other fungi are detected, an early application of Bordeaux mixture is recommended.

Finally, it is as well to suspend all scarifying whilst the flowers are in bloom. The stirring of the soil at this time of the year brings to the surface moist layers, which, under the influence of evaporation, considerably reduce the temperature of the atmosphere in the immediate neighborhood of the flowers, especially during the night time, and by this means sometimes interfering with the setting of the fruit.

## THE FARM.

### SEASONABLE NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL ROSEWORTHY  
AGRICULTURAL COLLEGE.

Haymaking is now almost general over the colony. Here and there farmers are giving a light working to their fallows, and young summer crops will be the better for a light horse-hoeing where there has been rain enough to germinate the seed. But the real work of the month will be the cutting and leading of hay.

Crops on the average are light, and most of them are more or less dirty; the continued drought accounts for the first condition, for no work however thorough, or manuring however sufficient, will produce a good crop when the rainfall is deficient. No doubt, crops on fallowed land, carefully worked and manured, are the better for the treatment, but even these are light. In those districts which suffer from excess of rain in the winter months the season has been favorable, and many men in those districts will cut heavy crops; but to these districts good yields are limited. That the crops are generally dirty is accounted for by the fact that the season 1896 was so dry as to give no germination of weeds on most of the fallows, and that the autumn rains came so late that most of the seeding had to be done dry. Even where fallows were fairly clean, the summer duststorms, so frequent last season, fouled them

with "all the idle weeds that grow in our sustaining corn." Wide areas will be cut for hay; but as stocks were cleaned out so thoroughly last year, and yields this year likely to be light, hay is likely to maintain fair value.

The use of the binder in securing the haycrop is now almost general. There is no doubt considerable expense connected with the binder, breakages more or less expensive are a matter of course, and the bill for twine is considerable; but the work all through is so expedited, and a job so clean and neat in all the stages of the processes of haymaking is possible with the binder that it is now practically a *sine quâ non*.

The stage of ripeness at which to cut cereal hay is by no means well defined. The market certainly likes good colors, but I am inclined to the belief, and that the more as I gain experience of cereal hay, that the South Australian consumer errs in requiring too much color. Certainly, there is less possibility for the adulteration of the chaff with headed straw or ordinary straw; but every consumer ought to know that there are other means of discovering this than by the degree of color. Farmers who make grass clover or trefoil hay, rightly I think, follow the practice of cutting shortly after the crop has bloomed. The trend of the teaching of physiological chemistry is to the effect that what is gained in the grain from the time it has begun to form is lost in the nutritive value of the flag and the straw. That the elaboration of the nutritive material in the plant almost stops after the seed has begun to form, and the energies of the plant take the form of the transference of the nutritive material already pre-ent in the cells of the leaf and stem of the plant to the grain, to be there stored up. The straw, it is held, becomes more woody and less digestible. However, I am not aware that exact feeding-tests have been made with cereal hay cut at different stages of ripeness, and I am inclined to the belief that for this class of hay, an exception to the general rule has to be followed, and I would certainly say, in the absence of such exact tests, that every day working experience seems to point out that the cereal hay cut at that stage at which it will yield a fair grain in the chaff—a grain sufficiently developed to germinate—has the highest nutritive value, especially for horses. Where a farmer is cutting for his own use, or for the better-informed consumer, I think it is to be recommended to allow a fair grain to form. This applies to wheaten hay, but it applies without doubt to oaten hay. Oats are a constant source of disappointment in this colony in this relation, some varieties more than others, but all more or less, and I believe the disappointment results from cutting too green. Many varieties of oats cut green make bitter hay, and are unpalatable to stock; Tartarian oats, for example, will even scour stock when cut green for hay. All-round, with oats, I certainly favor the practice of allowing them to get practically ripe before cutting. Cape oats, I believe, to be one of the best all-round forms of cereal hay; but whether they are to be preferred to real first class clean wheaten hay I am not prepared to say, both I would say are good. After Cape oats possibly the Algerian oat would come next; but it certainly makes unpalatable hay unless allowed to ripen, and even then it is inferior to Cape oat hay. The Scotch grey oat and the Champion oat will both make fair hay if cut with good judgment, but most of the other oats with which I am acquainted require for their healthy conditions a cooler climate and more moisture than prevails in South Australia, and over the greater part of our areas, I think it folly to attempt to grow them.

The self-sown haycrop, I fear, is a make-believe in South Australia. Certainly for the farm it may work out well. It will give good bulk, and, if cut green, will fetch within a few shillings a ton of the best wheaten or oaten hay. The colonial consumer is certainly an exception in this respect. In Europe, wild oat hay is very greatly discounted, and I understand is altogether boycotted by the cavalry forage-buyers in France. Its nutritive value I feel sure



is a long way behind good cereal hay, and I think it is unfortunate on the whole that a greater distinction in price is not made in South Australia between good cereal hay and the self-sown hay, which is generally largely-wild oats.

It may be worth while to mention some of the best hay-wheats suitable for our conditions. The characteristics of a good hay-wheat are :—

1. Early maturity, so that many of the weeds which are more or less in every crop are thus taken off before their seeds have shed.

2. Dense, heavy-weighing straw.—Wheats like Steinwedel, Allora, King's Jubilee are very hollow in the straw, and, in addition to being light, do not appear to be so nutritious as hay as some of the wheats with more pith in the straw, such as Tuscan, Leak's, Baart, and Medeah.

3. Good length of straw and strong vegetable growth.—Some years ago there was considerable prejudice against bearded wheats for hay. Where the hay is to be fed long there is some reason for it, but where it is to be chaffed I think the bearded wheats are to be preferred. I certainly have the impression, rightly or wrongly, that the bearded wheats give the most nutritive hay, and horses seem to me to prefer chaff cut from bearded wheats. Of the bearded wheats which I have grown I know that Medeah and Baart make very excellent, palatable, nutritious chaff. Medeah grows rankly, the straw is solid or almost solid, and on limestone lands, well manured, remarkably heavy crops can be grown without any danger of lodging or becoming laid. Baart will lodge in a wet year if the crop be heavy, but it has many advantages for our average mallee lands. It is early, hardy, prolific, weighs well, and is relished by stock. Of the beardless wheats well known in the market Leak's and Tuscan are amongst the best. Early Para makes a very nice hay, but does not yield so heavily nor yield so well as Tuscan or Leak's. Australian Wonder and White Essex are also very useful hay-wheats.

Haysheds are very rare in the colony, but a capacious hayshed is certainly a desideratum about a standing. It saves the expense of thatching, the open end is not spoiled when the stack is being consumed, the hay is more quickly stacked, and there is less risk of damage from rain during the "leading" time.

If the farmer has the choice of the sizes for his haystacks, I think he is well advised to build them large. In a large stack the hay inside sweats a little without becoming mouldy if it be "led" at the right time, and stock like it all the better. There is less outside to be damaged, it is more quickly built, and the cost of thatching is less.

## THE DAIRY.

Professor J. Robertson, Canadian Dairy Commissioner, states that as a result of the assistance given by the Canadian Government in the establishment of experimental dairy stations, and sending experts round the country to demonstrate the best methods of butter and cheese making, &c., the number of creameries in Quebec and Ontario provinces has increased from two in 1891 to 130 in 1896. In 1891, on Prince Edward's Island, ten acres only was sown to maize; in 1896, 15,000 acres were so cultivated. The increase in the value of the exports of butter and cheese during the five years amounted to £1,500,000, 60 per cent. of the cheese imported by Great Britain coming from Canada. The Department of Agriculture is now pushing the export of poultry, egg, bacon, and other minor industries of the farm, as well as fresh fruits, such as peaches, pears, grapes, tomatoes, &c. By means of agents to be appointed in England the producers will be kept advised of all the latest developments and requirements of the British market.

Complaints have often been made that certain kinds of food taint the milk

and butter from cows. In many cases this is not due to the food, but to its misuse. Milk rapidly absorbs any odor; and a dirty yard, or the proximity of any badly-smelling place or substance will impart its odor to the milk. Silage in the mangers at time of milking might impart a bad odor; but it would be more liable to do so from the soiled clothing and dirty hands of the people who have been serving out the silage and failed to cleanse themselves before milking the cows. Lucern also will impart a taint to milk if it is fed green to cows directly after being cut; but if left to wilt on the field for a few hours it will have no bad effect. As a general rule, cabbage, kail, turnips, and some other fodders will not taint the milk if fed shortly after the cows are turned out of the bails.

Who can tell how many acres of natural pasturage will maintain a cow year in and year out? In some districts "three acres and a cow" would be a fair thing. In other localities a cow might starve on twenty acres. But suppose crops were grown especially to provide food for cows—a mixed crop, between May and beginning of October, and a crop of maize or sorghum between October and April—what number of cows could be supported on three acres? Thirty-two tons of maize fodder have been grown near Adelaide, without irrigation, on one acre; this was the average of a large field. Put the year's crop of cereals and of maize at 22 tons, made into silage, and give each cow 40lbs. per day. This would keep three cows on an acre; but lucern hay would be wanted also, and this would probably require two acres to yield enough for the three cows, so that we come down to one cow per acre.

Spurrey (*Spergula arvensis*) in Norfolk, England, is called Pick-purse. It grows about 1ft. high, is a good fodder for all stock, but is a bad weed in arable land. It grows well on sandy, light soil. Seed was distributed to Branches of Agricultural Bureau seven years ago, without result.

Silage alone is not sufficient for a milking cow; but long experience and careful observation have shown that a complete feed for an average good cow should consist of 45lbs. ensilage, 5lbs. bran, 1lb. oilcake, and 8lbs. lucern hay or clover hay. There are many places in this colony where the clover or lucern hay cannot be provided, and something else should be substituted possessing similar properties. Maize cut when the corn begins to glaze makes the best silage.

It is not safe to accept results obtained under conditions differing from those under which we suffer. Dairy cattle which give surprising yields of butter and cheese in a country where the nourishing grasses are knee high throughout the season will be quite unprofitable where they have to graze over a whole acre to get a single meal. We must have hardy, thrifty cattle for our hot and dry climate. Improve our "common" cows by crossing with Jersey or Ayrshire pure bulls.

**SUMMER FODDERS.**—Maize, millets, sorghums, holcus, pumpkins, pie-melons, and other kinds of plants that are grown for summer and autumn fodder should never be sown too early, because the plants become checked by cold, and remain checked and stunted all the time. It would be better to sow rather late than too early. The average temperature required is 75° to 80° F. for these plants, and except in the very early districts, such as Baroota, and Telowie, it is better to sow in October than middle of September. Melons and pumpkins should be sown between rows of maize or sorghum, which will prevent the vines being blown about and injured. All fodder crops should be grown in drills, and be frequently cultivated to destroy weeds, and to let in air and prevent evaporation of moisture. If the surface is finely pulverised to a depth of 2in. and kept loose it will be as good as an irrigation.

## HOUSEHOLD NOTES.

**PICKLED CHERRIES.**—Take 4lbs. cherries, after removing the stones and stems, 12lbs. sugar, 1oz. cloves, 1 pint water. Place in an enamel or brass pan, and boil slowly till sugar is melted; then boil quickly till the juice is clear; then add 1 wineglass of apple or wine vinegar. Bottle and cork closely.

**RHUBARB JELLY.**—Wipe the stalks and cut them in inch lengths. Do not peel them. Put them in a porcelain kettle, to every pound of rhubarb add a gill of water. Stew until thoroughly cooked. Then strain the juice through a thick cloth. Measure it, and to every pint add a pound of sugar. Put the sugar and juice in a porcelain kettle, and boil for twenty minutes, or until a jelly is formed. Put away in tumblers or bowls.

**STRAW HATS, TO BLEACH.**—Any kind of straw goods may be bleached by dissolving a little oxalic acid in scalding water. Place the article in a clean glazed pan or wooden vessel, cover with the solution for five minutes, keeping it under with a clean stick. Then dry in the sun. Half an ounce of acid to a gallon of water will generally suffice.

**GINGER BEER.**—Bruise 2ozs. best ginger, and boil twenty minutes in 6qts. water. Strain it. Add 1lb. crystal sugar and 1oz. cream of tartar. Stir until all the sugar is dissolved. Pour it into an earthen jar, add twenty drops oil of lemons, or thirty drops essence of lemons, and  $\frac{1}{4}$ oz. tartaric acid. Let stand until the hand can be comfortably held in it—temperature about 112° F. Then add two tablespoonfuls good yeast; stir well, and bottle at once in strong bottles. It will be ready for use in a week.

**STOVE POLISH.**—Mix 4ozs. of sulphate of iron (copperas), 2ozs. bone-black, and 2ozs. black lead with sufficient water to make a creamy paste.

**HARD SODA SOAP.**—10lbs. Greenbank's double-refined 98 per cent caustic soda in an earthenware or iron vessel with 40lbs. (4galls.) water. Let stand till cooled to 80° F. Melt 75lbs. clean tallow or grease, *free from salt*. Skim and let it settle out any impurities. Weigh off 70lbs. of the clear liquid grease and put into a large vessel—say, a tub. Next *pour* in, in a thin stream, the dissolved soda, stirring all the time with flat wooden stirrer, 3in. broad, till the whole is mixed and smooth. Line a large square tank with calico, pour in the mixture, cover with rugs to keep warm. Leave to cool and form three or four days; then cut the 120lbs. cake of soap into bars with a piece of wire. The proportions *must* be exact: the lye *must* be poured into the grease, then stirred until smooth and uniform and *not* longer. Keep well covered to cool slowly. Keep the soap for a time before using.

**CRYSTAL FRUIT.**—For pears, apricots, peaches, &c., prepare a syrup of 1lb. sugar and half a pint water for each pound of fruit, boiled and skimmed during five or six minutes. Skin or peel the fruit very thinly, and simmer it in just enough water to cover it until tender, but do not allow it to become mushy or to break. Fruit should have been only just ripe and firm when taken off tree. Then lift carefully from the water and drain off the water well, and place the fruit in the boiling syrup; let it simmer four to five minutes. Take off from the fire; let it stand in syrup till next day. Drain off the syrup, thicken it with a little more sugar, and bring it to a boil, and pour over the fruit again. Repeat this process (thickening the syrup each day) four times more. The fruit may be put over the fire each time after adding the syrup, and boiled slowly two or three minutes. Finally, at any convenient time, take the fruit out of the syrup, place it on wire trays, and expose in the sun or in a cool oven till the surface is dry enough.

**FRUIT PASTE.**—Raspberries, currants, strawberries, apricots, and all soft fruits can be made into fruit paste in the following way:—Take the fruit when fully ripe, purify from strigs, &c., remove pips or stones (if any) either before or after boiling; boil till quite thick over a very slow fire, stir all the time to prevent burning; spread half an inch thick on strips of old calico, free from fluff, and expose to sun heat until tough and elastic; then sprinkle with coarse sugar crystals, cut into cubes, and pack up for use,

## FARM PRODUCE REPORT.

Messrs. A. W. Sandford & Co. report.—

October 31st, 1897.

Unfortunately we have to report the weather during October altogether too fine and pleasant for the agriculturists, particularly in the northern areas. A few intermittent showers have freshened up crops in some odd places, but the month, which is always a critical one for farmers, has this year been most disastrous. It was feared by some that the favorable prospects apparently existing at the beginning of September could only be maintained by genial showers and mild weather until the end of October, as the drier districts had not received a real subsoil soaking for past couple of years, but unfortunately the rain has held off and the weather continued too warm with now and then very hot winds for time of year.

The wheat plant, hardy as it is, however, has in consequence succumbed throughout most of the dry districts, we fear beyond recovery even should rain come within the next few days, although it would benefit crops in the moister localities. Blank failure again stares in the face many farmers, particularly outside Goyder's line of rainfall, and the question is now being seriously discussed amongst agriculturists whether it would not be in the best interests of the country to remove them, at almost any cost, on to good lands within districts having a better rainfall, not now being cultivated.

Haymaking is now in full swing, with, unfortunately, but poor results in many places; and as the wheat harvest will commence in a few days, and the export trade in flour has practically ceased, supplies of wheat on hand are considered sufficient to tide over till the new comes in. The local value of this cereal has dropped something like 6d. per bushel, although European markets remain steady, and the outlook as regards price is favorable for the coming export season. It is, however, doubtful whether we shall have much to dispose of, and at any rate impossible to estimate at present the probable quantity. Millers' offal lines maintain their value relatively much higher than intercolonial quotations, owing to the few mills which are now operating. Feeding grains are in slack demand, and a hand-to-mouth trade only being done in expectation of new local oats and feeding barley coming forward soon. Chaff merchants and large buyers in this line are at moment indisposed to give the prices asked by growers, so that there is a wide range in quotations at present, and it is probable that importations may be resumed, as intercolonial rates are lower.

The demand for potatoes is being supplied by locals, and as the hot weather is rapidly ripening those grown on the plains, although the crop is very light, values are at moment easier. Onions are also cheaper from the same cause. Wheat—South Australian has been sold at 5s. per bushel, one good-sized parcel of old delivered at port of shipment. Flour—Export orders booked some time ago are being executed in small lots at £12 15s., whilst daily wants are supplied at from £13 to £13 10s. for best roller. Bran, 1s. 2d. to 1s. 2½d.; pollard, 1s. 2½d. Chaff, £5 5s. to £5 15s. per 2,240lbs. bags in dumped, f.o.b., Port Adelaide. Oats—Local dun, from 2s. 10d. to 3s.; stout New Zealand feed, 3s. 3d. to 3s. 5d. Potatoes—Locals, £5 to £5 10s. Onions—New, local, £6.

## DAIRY PRODUCE.

In the dairy produce market business has been very active, and although supplies of butter should now be increasing, a decided tendency to falling off in quantity is already shown, which is leading speculators to operate keenly, with result that although a small surplus beyond present requirements is available, the market has steadily hardened, and there will be very little for European shipment; there is, however, some trade doing in western and over-border directions which could be considerably increased if quantities were procurable. As we anticipated, the easing in value of eggs did not continue long, and for the past couple of weeks there has in this line been a decided improvement in price, export buyers being very anxious to secure. Bacon has continued scarce, but without quotable alteration in value. New season's cheese is now coming forward in fair quantities, but the limited supply of matured available prevents any reduction in price of the latter, and prospects in this line favor the opinion that cheesemakers will continue to realise good prices for their product. Almonds have been moving steadily. Honey and beeswax find ready sale. In poultry the month's business has established the highest record for prices realised during the past twenty years, and although this must be accounted for to some extent by the lessened supply owing

to bad seasons, the very brisk demand for Western Australia justifies us in recommending greater attention to the poultry yard, as both poultry and eggs must continue to be largely imported by our Western neighbors for years to come.

To-day's selling rates are as follows:—Factory and creamery fresh butter in prints from 9½d. to 10½d.; private separator, dairy, and well-packed store boxes, 8½d. to 9½d.; bulk, in full supply, selling readily at 9½d. to 9¾d. Hen eggs, 9¾d.; duck, 10¾d. New season's cheese, 7d. to 7½d.; matured large to loaf, 8½d. to 9d.; prime New Zealand, in cases, 9d. to 10d., duty paid. Factory-cured sides of bacon, 9½d. to 9¾d.; farm flitches, 8½d. to 9d.; hams, 8½d. to 10½d. Clear extracted honey, 2½d. to 3d.; beeswax, 1s. Softshell almonds, 3d. to 3½d.; kernels, 6d. Coops of medium to fair hens sell at from 1s. 10d. to 2s. 3d. each; roosters, 2s. to 3s.; ducks, 2s. 2d. to 3s. 1d.; geese, 4s. to 4s. 9d.; pigeons, 9d.; turkeys, in medium condition, 10½d. per lb. live weight, fair table birds, 1s. 1½d.

## WEATHER AND CROP REPORTS.

**ARTHURTON.**—Since previous report we have had just over 2in. of rain, not enough, however, to put much in tanks and dams, consequently many will be out of water by the end of the year. Hay harvesting will soon be general, the crop being light.

**BORDERTOWN.**—Crops generally have suffered from dry weather, but with a good rain soon the harvest will be satisfactory. Stock have much improved, and shearing is about finished. Fruit gardens look well, and are fairly free from disease.

**BOWHILL.**—The hot dry weather during the past few weeks has caused the crops to go off considerably, especially on the rank patches. A good good fall of rain is urgently required to fill out the grain.

**BUTE.**—The crops are looking very well, especially those drilled in, which show a marked improvement over the broadcasted crops. Rainfall for September, 1·650 in.; for October, to 18th, 0·140in.

**CHERRY GARDENS.**—The weather during the past month has been very favorable for the crops.

**CLARE.**—We have only had 0·650in. of rain since last report, several cool changes passing along without much rain. Although the crops are not yet showing the effects of the dry weather to any extent, a good soaking rain would materially improve the yield. The drilled crops look very well, but generally those broadcasted without manure will be light. Apricots and plums promise only a light crop, but the apples and vines show very well.

**CRYSTAL BROOK.**—The season's prospects are not cheering. The grasses and wheat are dying off in many places, and unless we get a good soaking rain the returns will be very poor.

**DAWSON.**—The continued dry, hot, windy days and frosty nights have driven away all hope of a crop, quite half of the wheat having already perished. There will be no hay, and as feed is now very poor, and dams dry, or nearly so, the outlook is most serious.

**GAWLER RIVER.**—The dry weather during the past few weeks has had a very serious effect on the crops, though those on fallow land are holding out fairly well. Haymaking has commenced, but the yield will be very light. Stock are in good condition, and feed plentiful in places. Fruit trees and vines are healthy and pretty free from disease, but the setting of fruit is rather light. Bees are swarming freely, and the prospects for the honey season are fairly good. Rainfall for October, to 19th, 0·140in.

**GLADSTONE.**—Owing to the hot drying winds the crops are going back a lot, and rain is badly wanted. Feed is plentiful, the grass being still nice and green.

**JOHNSBURG.**—The weather continues very unfavorable, and unless a good soaking rain falls soon very few crops will return seed; many are already past recovery. Stock are in fair condition, but feed will soon become scarce.

**KADINA.**—After about a fortnight's hot dry weather we got about an inch of rain early in October, which did the crops a lot of good. Since then the weather has set in very dry, and the crops are short and light. Stock are in good condition.

**KANMANTOO.**—During past few weeks the weather has been very dry, and the crops have made little progress. The hay crops will be light, and grass scarcer than usual. Shearing is in full swing, but the wool will be light, though in good condition.

**LUCINDALE.**—We have been favored with splendid seasonable weather, having had rain on nine days during the month. Crops look well, and a good harvest is assured. Shearing will begin soon, and the clip promises to be good. Ticks and other vermin have been more than usually troublesome during the autumn and winter. Aphis on peach trees is also troublesome.

**MAITLAND.**—The past month has seriously affected the harvest prospects. Hay will be short and scarce, and, unless we have a good soaking rain, the wheat crop will be but little better than last year. The manured crops still look much better than those broadcasted. Feed is fairly good, and stock improving in condition. Rainfall since previous report has been under 1in.

**MEADOWS.**—The weather has been hot and sultry, but a fair fall of rain has since improved the crops and grass to a slight extent.

**MELROSE.**—The crops close to Melrose look well, and the hay will go from 1 ton to 1½ tons per acre. On the plains the crop will be poor. Rainfall for October, to 20th, 0·370in.

**MORGAN.**—The general prospects of the harvest are not nearly so good as they were a month since, the crops suffering severely from dry weather and strong winds.

**MOUNT BRYAN EAST.**—The continued dry weather is having a very serious effect on the crops, and unless good rain falls soon the returns will be very poor indeed.

**MOUNT COMPASS.**—The crops are looking well, and stock improving in condition. A heavy hailstorm did considerable injury to the onion crops.

**MUNDOORA.**—Hot winds and clouds of dust have been experienced lately, and great fears are entertained for the crops. Haymaking will start in a few days, and the yield will be very light, in many cases below last year's return. Feed is more plentiful than usual, but there is a scarcity of stock owing to the numerous deaths. Rain is anxiously looked for.

**MOUNT REMARKABLE.**—The crops are suffering from the dry weather, and a good fall of rain is badly needed, especially on the plains.

**NANTAWARRA.**—Rainfall for month, 1·510in. The strong drying winds experienced during the past few weeks has had a very bad effect on the crops. Stock of all kinds are in good condition.

**PINE FOREST.**—The weather has been very hot, with strong drying winds and occasional light showers. Crops generally are bad condition, and both hay and wheat will be light. Stock are in good condition. Fruit trees bearing well. Rainfall since previous report, 1·320in.

**PORT ELLIOT.**—Feed and crops doing well, but more rain is wanted. The apple crop will be very light, many trees having borne no blossom.

**PORT GERMEN.**—Owing to drying winds and absence of rain the crops have gone off very much, and the average both for wheat and hay will be poor. Rainfall for October, to 20th, 0·130in.

**QUORN.**—Only a few light showers have fallen since previous report, and the crop prospects are very gloomy. On the plains the crops are beyond recovery, and even in the more favored spots they will be very light. What wheat is left is too short for hay.

**SADDLEWORTH.**—Feed is very little ahead of what it was last year. A good min before this month is out would benefit the hay crops, which lately have not made the progress expected. Sorghum has been got in under very favorable conditions this month. Rainfall for September, 2·180in., a little above the average; total for past nine months, 13·470in., average (seventeen years) 15·758in. Rainfall for October, to 20th, 0·630in.

## EFFECTS OF LIME ON SOILS AND CROPS.

Lime is a valuable plant food, but its real worth is in its physical effect on the soil.

If applied to sandy soil it fills up openings, makes the particles adhere closely together, causes them to retain moisture better, and to absorb less heat during the day and retain more at night. On clay soils it separates the particles, making the soil more porous and easier for the passage of water and air, and therefore much warmer and easier to work.

Lime also hastens the decay of vegetable matter. If the soil is sour an application of lime will sweeten it, and if a green crop is ploughed under, lime will prevent the soil from becoming acid.

In giving a dressing of lime it is best put on a ploughed surface. This should be done either in the autumn or early in spring, before the growing season begins. It is not necessary to plough the lime in, as it will soon work its way down into the sod.

Lime should never be mixed with acid phosphates or ammoniated fertilisers. The best results are obtained when the soil is kept well supplied with the mineral ingredients, phosphoric acid, and potash. Nitrogen can be furnished by growing a green crop, and ploughing it under. This plan, if followed, will gradually increase the productive capacity of any soil.

## CENTRAL AGRICULTURAL BUREAU.

MONDAY, OCTOBER 4.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir S. Davenport, Hon. A. W. Sandford, Messrs. Samuel Goode, W. C. Grasby, M. Holtze, Thomas Hardy, T. Price, T. B. Robson, W. F. Snow, C. J. Valentine, and A. Molineux (Secretary).

**Fertilisers Act.**

The Minister intimated that the question of bringing guano under the operation of the Fertilisers Act would be dealt with in connection with the amending Act to be introduced.

Considerable discussion took place on the prospect of finding deposits of high-grade phosphatic rocks on Yorke's Peninsula, where rocks containing from 3 per cent. of phosphoric acid and upwards have already been found in two localities.

**Donations and Exchanges.**

The SECRETARY announced receipt of usual exchanges from Agricultural Departments.

**Extracts and Translations.**

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

158. *Number and Nature of Bacteria in Freshly-drawn Milk*—Hitherto it has been generally accepted as a fact that the bacteria present in such milk depend largely upon the amount of dirt and filth which finds its way into milk after it is drawn from the udder. Schultz, and others since, as well as quite lately Dr. V. A. Moore, have, however, found that it has been impossible in most cases to obtain milk free from bacteria when drawn directly into sterile flasks. These organisms must, therefore, gain access to the milk through their localisation and multiplication in the milk ducts, from which they are removed chiefly with the fore-milk (up to 600,000 in a cubic centimetre), as the last milk contains but very few; in fact, you may obtain almost sterilised milk from the last half of the milk if drawn directly into properly-prepared flasks. The bacteria, which become localised in the milk ducts, are for the greater part rapidly acid-producing organisms, i.e., they ferment milk sugar-forming acids. Gas-producing bacteria are presumably the result of external contamination. The sugar-fermenting bacteria make it necessary to pasteurise the milk at once, if its normal composition is to be retained. Much of the intestinal trouble arising from feeding infants with ordinarily pasteurised milk is undoubtedly due to the presence of acids produced before the pasteurisation by sugar-fermenting bacteria derived from the milk ducts.

159. *Codlin Moth*.—Baron von Schilling, a well-known natural philosopher, had invented in 1893 glass traps, by which he attracts and kills thousands of moths of all kinds. He offered since a prize for the cheapest glass traps, which was gained by Rochna Bros., of Frankfurt on the Oder. This firm sells 100 for 6s 3d., or 1,000 for £3; and received 700 orders for 33,000 glass traps. In the last number of the *Practical Ratgeber fuer Obstund Garten*, Baron von Schilling gives results. Amongst many, Baron von der Planitz, in Tyrol, used 6,200 gulden traps, at a total cost of 400 gulden (£33 1s.), in his orchard of Calville apples. He is perfectly satisfied that the expense was fully covered by the crop being so much freer from caterpillars. So far I had written for the *Journal* of July; but it was thought advisable to await further confirmation, which I received on October 1st in a number of the *Obstbau*, a monthly periodical established in 1880, and edited by Rev. Karl Guszmann for the Wurtemberg Pomological Society. In this number is an article by Inspector of Gardens Ph. Held, of Hohenheim, from which I take the following:—Mr. Held asks:—“Why shall we wait for the caterpillars to conceal themselves, and to kill them at that time? Why do we not catch the moths, so that they cannot lay their eggs? If there are no eggs, you will not have any fruit spoiled by the caterpillars! It was Baron H. von Schilling who invented the glass traps which have proved themselves as most excellent during the last two years. I catch in these traps codlin moths, and ever so many other noxious insects for fruits, vines, and kitchen vegetables. And now how to catch them! You can use any old glass for preserving jams; put a wire around it, so as to be able to hang it in a tree; or better, get the glass traps of Rochna Bros. If you remove them in autumn they ought to last many years. These traps,

of the size of half a litre (nearly a pint), are half-filled with a solution of sugar, thicker than sugar water, but not as thick as treacle, and a teaspoonful of apple jelly or stewed apples (pap). As soon as this mixture ferments, after some days, suspend the traps in the apple or pear trees. I caught frequently in one glass at night from twenty to twenty-six codlin moths. Of course you will at times renew the liquor. I say catch the moths, and thus prevent the females from destroying so many fruits by laying their egg in the blossom."

160. *The Gypsy Caterpillar*.—*Harper's Magazine* of last August states, in an article on it, that it had already overrun 220 square miles in the State of Massachusetts, devastated enormous districts, and their presence is also noted by a most repulsive stench. It is hairy, soot-gray, the female milky white, dotted with crimson and blue, of the thickness and length of a pill phial. The gypsy moth, on an average, lays about 600 eggs in a spongy cluster. Officially 760,000 clusters were destroyed in 1891 in only one district. By unrestricted increase of a single pair the entire vegetation of the United States would soon be devoured. Arsenical spraying does not kill them; a creosotic compound kills the eggs; but collection by hand has proved the best, although spraying with petroleum on stones, where they seek cover, and then burning them, is also in vogue. Birds are not hearty feeders even of the eggs. Every tree-trunk is bandaged, as the caterpillar is nocturnal, and prefers at sunrise to crawl from his high forage down the trunks to shady spots. But they are also searched for at dizzy heights in the trees by quite an army of uniformed men. Some 42,000,000 of trees have been inspected, besides building walls and fences exceeding 400,000. Results so far have justified the outlay, and the penning up of the gypsy is a wonderful achievement, without a parallel in the history of economic entomology. The egg-bearing female cannot fly. The State will not rest until the moth is absolutely extirpated from his present confines; but the nation, as well as this single plucky State, should assist.

161. *Fodders*.—Dr. Emil Potts reports on the exhibition of fodders at Hamburg, some of which are less known, viz:—1. Cakes made from the germs of maize, which are removed when maize is used for brewing beer in the United States as containing too much oil, and after being pressed you will find in the cakes from 8 per cent. to 10 per cent. of fat, from 20 per cent. to 30 per cent. of albumen and 15½ per cent. of starch. Containing generally 35 per cent. of nitrogenous and fatty substances, these cakes are an excellent fodder. 2. Kola fodder is the meal from the nut of Cola, or *Sterculia acuminata*, growing in Central and Western Africa. The nut is there much consumed as a food and as a medicine. The most important nourishment in the nut is that it contains so much more theine or caffeine than even the coffee-bean itself, viz., more than 2 per cent. against from 0·8 per cent. to 0·9 per cent. in coffee. There is no doubt that, as coffee is a good by-fodder for horses, from ½g. to 10g. of powdered kola-nut per day is very good for poor or tired out horses. The nut should not be fed to fowls, being almost a poison for them, and more so than coffee-beans. 3. After the system of Herr Podewils, the city of Hamburg exhibited, as fodder for fish and fowls, meat meals, fish meals, and blood meals, made from the animal wastes in the city, except from animals which had died from contagious diseases. For fowls the meal is mixed with eight to ten times as many boiled potatoes, bran, or chaffed hay. It is cheap at 14s. for 200lbs., and about as effective as the best corn. Twenty-five hens laid during last March, with this food, 450 eggs. The meat meal contains 94½ per cent. of dry substance, 56·1 per cent. nitrogenous matter, 50·6 digestible albumen, 16·8 of fat, and 18·2 of ashes. For the first few weeks pigs may also be fattened upon these meals, but not later on, or the bacon will be too soft.

162. *Starch for Calves*.—André Gouin and others use now the potato starch as a succedaneum instead of fats, linseed, &c., for feeding calves, viz., 50g. of starch to 1½ pints of skim milk. Half of the milk is slowly boiled, and while the starch is added to it it is stirred to prevent it getting into lumps, and then the rest of the milk is added to make the mixture cool enough.

### Prohibition of Introduction of Bulbs from Japan.

Mr. HOLTZE said he had received information from the Kew Gardens that bulbs of Liliums had been received from Japan affected by some disease of a very serious nature. He thought that it would be well to recommend that the introduction of bulbous plants from Japan should be prohibited for the present until they knew whether the disease would attack onions, &c. Nothing of real value would be kept out, and the serious consequences which would result from the introduction of any new disease would justify such action. Mr. SNOW said it would be a difficult matter to enforce such prohibition, as the officers of steamers trading with Japan frequently brought bulbs with them, and these were disposed of in the colony. Mr. HARDY agreed, but thought the matter of sufficient importance to warrant the action suggested by Mr. Holtze. It was decided to ask the Minister to prohibit the introduction of bulbs from Japan.



### **Destruction of Weeds.**

Mr. HARDY mentioned that in some districts the landowners had just been served with notices to destroy plants of *Asphodelus fistulosus* growing on their land. As the plant was already in seed it meant that to simply cut them up would distribute the plant all over land at present clean. Unless the plants were burnt it would be far better to leave them alone this season. Mr. HOLTZE said it was useless cutting up the plant now, as the seeds would ripen in the pods. The plants should be cut up before they begin to flower. Mr. VALENTINE said this weed was as far north as Hergott, and he had several cases come under his notice of sheep and cattle being killed by it. He did not think it was actually poisonous, but it undoubtedly had an injurious effect on stock. It was, however, never eaten when there was anything else to be had. It was decided to ask the Minister to call the attention of the local authorities to the fact that it was no use cutting up the weed now unless it was afterwards gathered together and burnt.

### **New Members.**

The following gentlemen were approved to act as members of the under-mentioned Branches:—Dawson, Rev. Thos. Wetherall; Quorn, Messrs. Chas. Potter and G. Baker; Renmark, Messrs. F. J. Burrill, H. H. Swiney, and H. Fitch; Narridy, Messrs. Jno. Liddle and J. C. Myatt.

### **Reports by Branches.**

The SECRETARY reported receipt since previous meeting of thirty-seven reports of Branch meetings.

MONDAY, OCTOBER 18.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir Samuel Davenport, Messrs. S. Goode, W. C. Grasby, Thos. Hardy, T. Price, W. F. Snow, C. J. Valentine, and A. Molineux (Secretary).

### **Finance.**

The Finance Committee reported expenditure to date £74 0s. 4d. for contingencies. Accounts to the amount of £220 10s. 2d. were passed for payment. The Chairman explained that the heavy expense was due to the accounts for the printing of the *Journal of Agriculture and Industry* for two months coming together.

### **Bureau Office.**

Considerable discussion took place on the question of office accommodation. It was pointed out that the present accommodation was insufficient, and that the many valuable exchanges received were not readily available for reference owing to want of room to arrange them. Members thought the library should be made as complete as possible for the benefit of members of the Bureau and others. It was decided to wait on the Minister and ask for more office room.

### **Annual Report.**

The SECRETARY tabled annual report of the Bureau for year ending June 30, 1897. It was left to the Chairman and Secretary to sign and forward to the Minister of Agriculture.

### **Donations and Exchanges.**

The SECRETARY announced gift of a number of glass traps for catching codlin and other moths, presented by the South Australian Glass Bottle Co.; also receipt of usual exchanges from various agricultural departments.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

163. *Cut Potatoes*.—A. Gizard gives in the *Journal d'Agriculture pratique* results of his experiments during three years with five different varieties of potatoes. Reckoning the produce from the whole tuber weighing 100g. (nearly 3 oz.) at 100, he found on an average that if a potato of 100g. weight was cut once the produce of one set was 69.36, or nearly 30 per cent. less, if one of 200g. (nearly 6cz.) once cut, the produce was 82, or 18 per cent. less; if one of 300g. (about 8½oz.) cut into three pieces, the produce was 74. Two tubers of 50g. each planted together produced 95.36; three of 30g. each 89.12. In all cases he had the largest return from whole tubers of medium weight.

164. *Growth of Trees from Seed*.—Dr. Cieslar believes, after a number of experiments, chiefly with the seeds of pines, that an increased growth of trees is hereditary if the seeds have been collected from trees in warmer climates. A poorer growth was apparent at least for a number of years, if the seeds were collected either from a greater height above the sea, or more northerly (and therefore in Europe in a colder climate). How long this difference in the growth will be observable has not yet been determined.

165. *Ferments Transplanted into Vineyards*.—Professor Dr. Müller, of Thurgau, says you can induce a quicker and a cleaner fermentation in must if you take, eight days before the general vintage, a certain quantity of healthy, uninjured grapes, press them and allow the must to ferment well covered. Of this add at the general vintage from two to two and-a-half pints to every 22galls while crushing the grapes. You can still improve this by adding pure cultures of bacteria to the first pressed must. Dr. Müller, however, recurs to his former statement, that he thinks the vineyard itself can be inoculated with better ferments by using pure cultures with white grapes until the must ferments, press them, bring the husks to the vineyard, and hoe them at once into the soil. This may after some years make the use of pure cultures from renowned vineyards unnecessary. To bring the liquid sediment of ferments into the vineyard is less successful, as the cells generally do not show then any vitality, especially as it becomes decomposed in the ground, and kills any yet living cells.

166. *Pannonian Trefol.*—*Trifolium pannonicum* is recommended by Dr. Stebler, of Suisse Control Station for Seeds, as a good permanent fodder plant, suitable in hilly districts. It is a native of the Carpathians of Hungary, grows but slowly the first year; but can be cut twice a year afterwards, at the time the first flowers begin to show. It grows to a height of about 3ft. 6in., and is nearly as good as red clover.

167. *Peas Destroyed* by a fungus (*Ascochyta pisu lib*), have been observed at several localities in Pomerania. It appears at an earlier or later time, spreads from the neck of the root upwards and downwards, blackens and kills the plant. Seeds have been found to transmit the fungus, against which as yet no remedy is known. [I believe I have observed it here this year.—CH. AGL B.]

168. *Bonemeal*.—Professor Mørck says that the result of experiments made with bonemeal is, that its value as a manure is chiefly in connection with its contents of nitrogen. In fact, in light sandy soil, oats and barley showed only from 20 to 30 per cent. less; in a loamy soil, from 30 to 45 per cent. less grain than another plot manured with nitrate of soda. The efficacy of phosphoric acid in bonemeal against that soluble in water is insignificant, and especially after the first year, except where sulphuric acid had been used with the bones to such an extent as was necessary to form di-calcium phosphate.

169. *Manuring of Vines and Quality of Wines*.—Vines do not require so much plant-food for the formation of grapes as for the wood and leaves. While the hecture (2½ acres) of vines gave, in 1892, only 148galls. of wine, and took from the soil 74lbs. of nitrogen, 22lbs. of phosphoric acid, and 82lbs. of potash; the crop of 1893, consisting of 1,224galls., required 82lbs. of nitrogen, 23lbs. of phosphoric acid, and 102lbs. of potash. A crop which thus was nearly ten times as large consumed little more, except as regards potash. Formerly it was taken for granted that to manure vines would injure the quality of the wine. This is doubted by Mr. A. Muntz. In the champagne, vines receive a very large quantity of manure at the planting, and afterwards every year 250lbs. of nitrogen, 242lbs. of phosphoric acid, and 266lbs. of potash, although only 84lbs. of nitrogen, 48lbs. of phosphoric acid, and 94lbs. of potash are required for the year. Nearly the same is done in Medoc. Exactly the finest wines receive most manure, and thus the old objection must fall to the ground. It should be mentioned, however, that animal manure is only used as a compost, and it is mentioned by him as not impossible that mineral manures, which act quickly, might not be so innocuous.

170. *The Toad*.—Mr. A. A. Kirkland, M.S., Assistant Entomologist of the United States declares from his full investigations that the food of the toad (*Bufo lentiginos*) consist of 87 per cent. of actually injurious insects against only 11 per cent., which may be considered beneficial to man. He devours worms, snails, sow bugs, millepedes, grasshoppers and crickets, and is particularly fond of ants, also gipsy-moths, potato beetles, spiders, occasionally a ladybird, an ichneumon fly, and it likes carrion-beetles. The English experiences of the toad are

essentially similar, and no further comment upon the valuable services of this useful amphibian is necessary. Besides, it is quite harmless, not venomous, although ugly, and it is to be hoped that the popular prejudice greatly based upon old superstition will die out so that the toad shall be protected as the farmers' and especially also the gardeners' friend. Unfortunately it is only too scarce in South Australia.

171. *Grafting Vines*.—To simplify the process of grafting vines on American stocks, Dr. L. Krözer has invented an implement in appearance like a sewing-machine, at which he sits. After fitting the stocks which appear to be one or two years old rooted vines to the graft, he holds them where they join through an opening, when by treading the pedal they are well tied together in half a minute, apparently by an indiarubber band.

172. *Alnit* (a similar fungus to that which enables pea-flowering plants to form nodules on their roots, and to assimilate nitrogen from the air), has been found by Mr. Caron, of Hesse, and separated as a pure culture, which is said to enable cereals to get nitrogen from the air. It is said that a small quantity of the *Bacillus Ellenbachensis* Alpha, on sale in little bottles under the name of Alnit, at the chemical manufactory of Beyer & Co., at Elberfeld, is sufficient for half an acre, and to obtain a luxurious growth of all cereals without any nitrogenous manure. The Minister of Agriculture of Prussia desires the German experimental stations to try Alnit this coming season.

### New Branch.

The formation of a Branch of the Bureau at Forster, on the east side of the River Murray, was approved, with the following gentlemen as members:—Messrs. F. Towill, W. Johns, A. Johns, H. Fidge, J. R. Bolt, jun., C. Topsfield, J. Sears, F. Johns, S. Sears, J. Prosser, and S. H. Plummer.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Finniss, Mr. J. Chibnall; Belair, Messrs. H. Halstead and O. Nootnagel; Kadina, Messrs. J. H. Inglis and R. A. Heath, jun; Maitland, Messrs. John Hill and William Wilson; Yankalilla, Mr. Thomas Stacey; Bulaklava, Messrs. J. Crawford and C. H. Reid; Lyrup, Mr. A. Weaver.

### Reports by Branches.

The SECRETARY reported receipt since previous meeting of twenty-eight reports of Branch meetings.

## REPORTS OF BRANCHES.

### Naracoorte, September 8.

Present—Messrs. O. Hunt (Chairman), D. McInnes, H. Buck, J. Wynes, A. Limbert, J. D. Smith, and R. U. Paris (Hon. Sec.).

**BINDER AND HEADER v. STRIPPER.**—Mr. Buck read the following paper on this subject:—

I have had much experience with both these machines, and I consider farmers should use the string binder, although some say that there is too much work in threshing. I think you are well repaid for that by the stack of straw you have for your stock as a stand-by for the winter. Then again the red rust may set in in a crop when green, and by cutting it down and stooking it the grain will be hardened, and thereby prevent the rust from going any further. If the farmer waits until the crop is fit to strip it is ruined by the red rust. If mowed down and stooked the farmer will have a better chance to save his crop against fire. I have seen heavy rain or heavy wind set in before the crop was ready to strip and ruin half of it. A lot of this could be avoided by using the binder; it also keeps the ground free from weeds. I have had some experience in stripping, and always find the stripper waste from 1 bush. per acre upwards and spreads weeds, whilst the binder will gather it all in. Just a few remarks re threshing. If a farmer cannot get a thresher the stripper will do instead. Fasten the stripper down facing the comb towards the flywheel of the horseworks, working the belt on the pulley. It can be easily worked by one horse if changed about. It will require four men to work the machine, and a boy to drive the horse. The stripper is fed the same way as the thresher, letting the straw go through. On this principle a farmer can thresh from twenty to twenty-five bags a day and have his straw stacked.

Members generally agreed with Mr. Buck, and considerable discussion took place on the best way to utilise the straw, the relative merits of oil, gas, and steam engines for chaff works, &c.

**BONEDUST.**—Mr. Wynes said he noticed his statement that bonedust with the oil in it was more effective than without had been questioned. He knew those who used bonedust in England agreed with his statement. He also called attention to the fact that the Fertilisers Act provided that commercial fertilisers must be sold by analysis, so that purchasers ran no risks. The Chairman thought the class of soil and the climate might have something to do with the relative merits of bonedust from raw and steamed bones.

**SEED EXPERIMENTS.**—The Hon. Secretary tabled splendid specimens of Broadleaf mustard and Japan clover, grown at the Near Naracoorte school from Bureau seeds.

### **Norton's Summit, September 11.**

**Present**—Messrs. J. Jennings (in chair), J. Jennings, jun., J. Cowling, A. Smith, Thomas Playford, jun., J. Bishop, J. Pellew, and W. H. Osborne (Hon. Sec.)

**CODLIN MOTH.**—A long discussion on this subject took place, and the general opinion of members was that the natural enemies would ultimately prove the most effectual means of keeping this pest in check.

### **Port Germein, September 26.**

**Present**—Messrs. G. Stone (Chairman), J. K. Deer, R. H. Henderson, W. Crittenden, W. Broadbear, A. Thomson, and H. J. Gluyas (Hon. Sec.).

**SEED EXPERIMENTS.**—Mr. Henderson reported very favorably of Mammoth Chili squash, and distributed seeds for further trial.

**FIELD TRIAL.**—It was decided to communicate with Crystal Brook Branch in reference to proposed Field Trial Society.

**SEASON.**—Mr. Crittenden reported rainfall at Baroota for year to date, 6·750in. At Telowie 8·370in. have been recorded.

### **Stockport, September 27.**

**Present**—Messrs. F. Watts (Chairman), C. W. Smith, D. G. Stribling, G. Burdon, T. Megaw, T. Howard, W. Barker, J. Murray (Hon. Sec.), and one visitor.

**CONGRESS.**—Members reported on proceedings of recent Congress held in Adelaide, and on matters of interest at the Adelaide show. Mr. C. W. Smith specially mentioned a combined header, thresher, and bagger, which he thought would be a great boon to the farmer if it would do all that is claimed for it.

### **Lucindale, September 11.**

**Present**—Messrs. S. Tavender (Chairman), E. Hall, A. Dow, W. Dow, H. Langberg, J. Bourne, E. E. Dutton, A. Matheson, O. A. Witt (Hon. Sec.), and three visitors.

**PAPER.**—The Hon. Secretary read a paper on "Insect Friends," by Mr. Claude Fuller, entomologist, Bureau of Agriculture, Western Australia, and a short discussion followed.

**SEED EXPERIMENTS.**—The Hon. Secretary tabled splendid sample of Danish Island oats, sown on June 3rd. Other members reported on progress of the experiments with Bureau seeds.

**Bowhill, September 18.**

Present—Messrs. W. G. F. Plummer (Chairman), J. G. Whitfield, J. MacGlashan, W. Towill, C. Drogemuller, J. Waters, W. Tyler, J. Gregory, H. H. Plummer (Hon. Sec.), and ten visitors.

**SEED EXPERIMENTS.**—Mr. Drogemuller reported very favorably on the Danish Island oats distributed by the Bureau. It was a remarkable stooler, with very large stems, and he thought it the best yet tried in the district. Mr. Towill said his grass seeds had not yet come up, although they had had plenty of rain. [The seeds may remain in the ground until autumn before growing. Do not disturb the soil until then.—GEN SEC.]

**DAIRYING.**—In reply to question, members were of opinion that there was not yet sufficient cleared land to allow them to go in for co-operative dairying. As the farmers became more settled dairying should pay, as the natural grasses are good, and maize, sorghum, lucern, &c., can be grown in large quantities on the swamps.

**SEED WHEAT.**—In reply to question, members were of opinion that the stripper was liable to crack the grain and injure the germ. consequently affecting the growth of the plant.

**WATER ON THE FARM.**—Mr. Tyler read a paper on “Does farming pay when the farmers have to cart water,” of which the following is the substance :—

My partner and myself were amongst the first settlers in this district and we have found out that farming does not pay when water has to be carted for stock and for domestic purposes. We have had eight horses and one cow to water, and during past three and a half years have, on an average, carted nine tanks, containing 200 gallons, each week. This means a terrible loss of time, especially during seedtime and harvest, as owing to the character of the roads it takes four horses to draw a light wagon holding a 200 gallon cask of water. This, with wear and tear, might fairly be set down at £1 per week, making an expense during the time we have been here of about £180. This sum, spent on well-sinking or tank-building, would ensure a good supply. Owing to the fact that stone is plentiful, and lime can be burnt by the farmer, he can make a large tank at little expense. If he cannot build he can easily make the sides of concrete, by digging out to a width of about 18in. to the depth you want to go. Fill this up with concrete, and when well set remove the earth from the centre, and put in a concrete bottom. To secure catchment, if the roof space is not sufficient, select a suitable place, and concrete the surface. An acre done this way will fit a very large underground tank. The best way, however, is to sink a well, as once you get a good supply you are not dependent upon the rainfall. We have just sunk a well to a depth of 250ft., when we got a nice supply of good water. A well should not cost more than 10s. per foot. We had good easy sinking for 180ft.; in fact, too easy, as we had to timber to that depth, then we came on cliff rock. We averaged about 2ft. 9in. of sinking per day, including time occupied in cutting, carting, and fixing the timber. The well is a very great convenience to us, as the water is easily raised. We have erected a whim, and with two 30-gallon casks one horse draws them easily. A good average farm horse could draw 60 gallons at a time. I would strongly advise the farmers in this district to sink for water, instead of continuing the laborious practice of water-carting.

Members unanimously favored well-sinking. The soil is so porous that a catchment for dams or tanks has to be made with concrete.

**Port Broughton, September 13.**

Present—Messrs. R. W. Bawden (Chairman), W. Bennier, W. Tonkin, B. Excell, H. M. Peel, R. Storr, G. Pattingale, R. Dennis, J. Harford, I. Rayson, J. Barclay, H. H. Whittle, W. R. Whittaker, S. M. Bawden (Hon. Sec.), and two visitors.

**ROLLING AND HARROWING WHEAT CROPS.**—In reply to questions, as to whether rolling and harrowing growing crops was beneficial. Mr. Bennier favored rolling with heavy roller on sandy soils; he believed it would check the spread of takeall. Mr. Whittle favored rolling, as the expense was very small, and the benefits considerable; he had rolled all his crops. It was carried that rolling, when the crop is about 6in. high, is beneficial. Mr.

Whittle favored harrowing the crop on heavy soil, but he had no experience as to what effect it would have on crops on light soil, though he was trying an experiment. Mr. Whittaker thought a light harrowing beneficial on sandy soil. Mr. Tonkin said he tried the effect of harrowing this season, but a very heavy storm occurred directly after and most of the crop was blown away. It was decided that they had not sufficient experience to give a definite opinion on this subject.

**MANURES.**—Mr. Harford read a paper on this subject.

**BRANCH SHOW.**—The combined branch show, held on September 15th, was a great success, the exhibits being first class. There was considerable competition for the special prizes offered by the General Secretary, and much interest was shown. In the section "waste substances utilised," Mr. W. Jettner secured the first prize with a collection of fifty different articles made from substances not generally used. Mr. Kennedy secured second prize in this section and first for farm and dairy produce with a splendid collection of hams, bacon, butter, pickles, jams, sauces, &c., and also first prize for manufactured products and home industries. For products of orchard and garden, Mr. R. W. Bawden, with a splendid assortment, was first. Bread and small goods created much competition, and one of the judges said he had never seen a better display in this line. There were thirteen entries of home-made bread. The visitors were greatly surprised to see what useful articles could be made from the waste to be found on most farms, and the show proved a good object lesson to many.

### **Eudunda, September 13.**

**Present**—F. W. Paech (in chair), C. Wainwright, J. A. Pfitzner, J. W. Kriebel, E. T. Kunoth, H. D. Wiel, C. Pfeiffer, and W. H. Marshall (Hon. Sec.).

**BRANCH SHOW.**—Considerable business in connection with the forthcoming show was transacted.

### **Port Elliot, September 25.**

**Present**—Messrs. C. H. Hussey (Chairman), H. Green, J. Virgin, E. Wood, P. O. Hutchinson, F. T. Fischer, W. E. Hargreaves, J. Brown, H. Pannell, and E. Hill (Hon. Sec.).

**GREEN FODDER.**—Mr. Fischer spoke very favorably of the excellent results obtained by feeding sheep and lambs on green mustard.

**MANURES.**—Mr. Fischer reported good results from use of kainit and bonedust for potatoes. He worked into the ground 2cwt. of kainit a month before planting, and 2cwt. of bonedust at time of planting. He got from a plot one and a half chains square over a ton of large potatoes. Mr. Brown spoke very highly of the educational value of a visit to the Roseworthy College. To see the effect of the various manures on different soils was worth the trouble and expense incurred.

**EXHIBIT.**—Mr. Hutchinson tabled sample of Lawyer cane from Queensland. This is used for basketwork and other similar purposes, and grows to the top of the highest trees.

**WEEDS.**—Mr. Green called attention to the spread of the weed known as charlock, or wild mustard, which he believed had been introduced with oats from New Zealand. It would prove a very troublesome pest if not checked.

**STUD BULLS.**—Members thought the Government could assist more by lessening the quarantine expenses on imported cattle than by importing a few bulls of one particular breed.

### Holder, September 25.

Present—Messrs. F. A. Giant (Chairman), E. Crocker, F. Rogers, T. Basford, J. Maddocks, J. O'Connell, P. J. Brougham, H. Vaughan, H. Blizard, C. Anderson, J. J. Odgers (Hon. Sec.), and one visitor.

**CATERPILLAR PEST.**—Mr Vaughan reported that the night-feeding caterpillars had appeared again in the orchard. They were rarely found on the trees, but generally at the foot, just under the soil. He stated that lime sprinkled on the soil seemed to prevent their doing any harm. If a mixture of 20 lbs. bran and 8 ozs. of Paris green are mixed to a thick paste with treacle or sugar and water, and pieces of the mixture placed near the stems, the caterpillars eat it greedily and are destroyed.

**PRUNING.**—Mr. Vaughan conducted members through the Ramco orchard and nursery, and explained matters in connection with the pruning, planting, and care of fruit trees. He strongly advocated encouraging lateral instead of vertical branches.

### Pyap, August 27.

Present—Messrs. K. F. Huselius (Chairman), C. Billett, T. Teale, T. Smith, A. J. Brocklehurst, E. Robinson, G. Clark, B. T. H. Cox, F. Muirhead, J. Aird, W. Axon, J. Holt, J. Harrington, H. Mills, W. C. Rodgers (Hon. Sec.), S. McIntosh (expert Village Settlements), and two visitors.

**DAIRYING.**—Mr. S. McIntosh addressed the meeting upon this subject to the following effect:—

He was not practically acquainted with this industry, but was well acquainted with those who had been long connected with dairying, and who had given him the benefit of their experience. This was one of the mainstays of farming, and one really good cow would produce enough butter to supply an average family. He thought the small holder should try to get an animal that would prove profitable both for milk and for beef; perhaps the cross between an Ayrshire bull and an Alderney or Jersey cow would suit best. Hay was an expensive item for feeding to dairy cows. It had reached £7 to £8 per ton for chaffed hay, and ordinarily it was about £3 10s. Holder Village Association had taken the matter up, were sowing lucern and other fodders, and had purchased a good Ayrshire bull, which is on service for other Associations on fee of 10s. The Ayrshire-Alderney cross gives a good milker, good beef, and a hardy animal. A second cross animal is generally inferior. The Holsteins came next, but require more food, which is difficult to provide on the Murray. Alderney bull and Ayrshire cow is not desirable, and in-and-in breeding is a great mistake. The dam and granddam of the bull must have been good milkers, otherwise he is not a good dairy bull. Rapid milking is necessary, and frequent changes of milkers will soon ruin a good milking cow. The bull should not run with the herd; a heifer should be three years old before being mated. Experience has taught Scotch farmers to feed their cows whilst in the bails, as this makes them contented. One person only should have management of the dairy and herd, and he must have had experience. Cows must be fed regularly as well as be milked at regular times. Women are best for milking the cows. If a cow refuses to give down her milk, feed her; but do not let the calf come with her during the milking time. He then described the "points" of a good milking cow; her tail is thin and fine to brush, hair fine; never has stag horns, light brisket, and high and weighty in the hind quarters; the converse being the points of a good beef cow. With exception of Polled Angus, very few polled cows are good milkers, but they make good beef. In forming a dairy herd, cull out all inferior cows, and put the bull to the remainder. Feed the cows directly they come in, and keep the calf out of sight. Teach the cows to come to the bail; tie the tail, and wash the udder and teats with luke-warm water. Keep the yards very clean. Whilst many kinds of fodder are good, the best is made up as follows:—Put haychaff into a bin, add bran, (salt is optional), treat with hot water or steam, stir well, and feed in troughs at head of the bail. This will keep the cows contented in the yard. He then mentioned several plants that are cultivated as fodder for stock, also for silage. If the cow is a good one, allow her to run six to nine months; cows are generally better after the second calving. Keep only the best strain of stock, and secure a separator and other necessary modern dairy appliances. Water used in butter-making must be quite clear. Muddy water should be purified with lime or charcoal. Poultry and pigs should be reared in conjunction with dairy-farming.

**Mundoorra, September 17.**

Present—Messrs. G. Harris (in chair), H. M. Smith, R. Harris, W. Atkinson, D. Smith, W. J. Shearer, and A. E. Gardiner (Hon. Sec.).

**MANURING.**—Mr. H. M. Smith spoke highly of the recent Congress of the Bureau, and referred to the advantage of manuring, bonedust being very favorably spoken of. Some of the members thought bonedust was not so suitable for this dry district as superphosphate. The Chairman said he had used Thomas's phosphate with fair results, but nitrate of soda and sulphate of ammonia gave no result. The Hon. Secretary said he had tried treating seed wheat with superphosphate while wet from pickling, using about 12lbs. of manure to the bushel. The result was very unsatisfactory, only about one-quarter of the grain growing. He thought it might possibly be due to the fact that he allowed the seed to dry before using it.

**EXHIBITS.**—Mr. D. Smith tabled good sample of home-dried raisins.

**Gumeracha, September 20.**

Present—Messrs. W. A. Lee (in chair), R. P. Scott, S. Hannaford, W. J. Hannaford, D. Hanna, S. Ridler, W. V. Bond, G. F. Nepean-Smith, Dr. J. R. Stephens, and Dr. Gray Nicholls (Hon. Sec.).

**CODLIN MOTH.**—Considerable discussion took place on the codlin moth regulations, members being of opinion that only one spraying should be compulsory; that scraping the stems to the height of the bandages only was necessary; that it was impractical to pick up fallen fruit daily, and infested fruit from the trees each week; and that cultivation under the trees was not advisable, as the clods became harbors for the pest. The members suggested that a Government dépôt should be established, where all cases should be thoroughly disinfected before being returned to the orchards.

**Port Pirie, September 28.**

Present—Messrs. J. Lawrie (in chair), G. M. Wright, E. Stephens, Thos. Gambrell, P. J. Spain, R. F. Humphris, H. B. Welch, and R. M. Bertram (Hon. Sec.).

**DRIED FRUITS.**—Mr. Gambrell tabled samples of apples, plums, apricots, figs, and raisins grown and dried by himself at Napperby. Members were particularly pleased with this exhibit, and were of opinion that the raisins were far superior to the average colonial dried fruit.

**FIELD TRIALS.**—The rules of the proposed Field Trial Society were agreed to, and delegates appointed to represent the Branch.

**HON. SECRETARY.**—Mr. Bertram was granted six months' leave of absence owing to temporary removal from the district, and Mr. G. M. Wright was appointed to act as Hon. Sec.

**Norton's Summit, October 2.**

Present—Messrs. J. Jennings (Chairman), J. Pellew, J. Bishop, J. J. Bishop, W. Merchant, C. Jennings, C. W. Giles, A. Smith, and W. H. Osborne (Hon. Sec.).

**FRUIT PESTS.**—Discussion took place on the possibility of introducing the dreaded Queensland fruit fly with bananas, pineapples, &c., and in fruit packages. It was stated that two parasites had been noticed feeding on the codlin moth larvæ, one of which, similar in appearance to a wood beetle, is a voracious feeder. Members were of opinion that experiments should be



conducted in a garden in the hills in the treatment of codlin moth on similar lines to those to be conducted at Marion by the Inspector of Fruit, a careful record being kept of the time occupied, the quantity of fruit destroyed, &c.

**HORTICULTURAL UNION.**—Most of the members were of opinion that a union of the growers of fruit in the vicinity of Adelaide would be of the greatest benefit, but the great difficulty presents itself in "How is it to be effected."

**AUSTRALASIAN FRUITGROWERS' UNION.**—The Chairman stated that at the Brisbane Fruitgrowers' Conference it was agreed that each delegate should use his influence to establish branches of the Union in his own district. Members of this Branch do not generally consider that much benefit would result from the establishment of such Branches.

### Calca, October 2.

Present—Messrs. Jas. Bowman (Chairman), W. Wilcott, A. Newbold, and D. P. Thomas (Hon. Sec.).

**FODDER PLANTS.**—Mr. Plush forwarded well-grown sample of kale from Bureau seed.

**RAINFALL.**—For September, 1·000in.

### Amyton, September 30.

Present—Messrs. Jos. Gum (Chairman), W. Mills, Thos. Gum, W. Hawke, H. Gray, S. Thomas (Hon. Sec.), and two visitors.

**SEED EXPERIMENTS.**—Members, with one exception, reported general failure with seed experiments last season, owing to drought. Rainfall for 1896, 8·035in.; for first six months of 1897, 2·615in.; July 1 to September 30, 3·820in.

**FARMING A 640-ACRE HOLDING.**—Mr. W. Mills read a paper on this subject, of which the following is the substance:—

Every farmer should work his farm on a definite system. My system of working a farm of 640 acres, combining grazing with cultivation, would be as follows:—First, I would divide the farm into four paddocks of 150 acres each, leaving a block of 40 acres for the homestead as nearly in the centre of the farm as a suitable spot could be found. I would crop 300 acres each year, of which 150 acres would be fallow land. Instead of putting in all fallow, I would work the previous year's fallow. By ploughing early, and keeping the land clean, two good crops can be obtained from one fallowing, the second of which can be easily and cheaply worked with the scarifier. I prefer this to putting in 300 acres fallow land for the following reasons: A team of eight horses is sufficient to fallow 150 acres, and to do the seeding and harvest work of 300 acres. If you do more fallow with the one team you have portion badly worked, and the horses are in poor fettle, and the shoulders in bad condition for the harvest work. If you run two teams, you have all that extra expense, and after the fallowing is done have really no use for the second team. I would use the binder and header to harvest the crop, and to conserve a large supply of good wholesome food for the working stock. Dairying will scarcely pay owing to distance from market, and to the fact that butter is low in price when we are best able to supply it. Sheep, however, are a decided benefit. You must, of course, have your fences sheep-proof, but the whole of this expense should not be debited against the sheep, as in my opinion such a fence is money well spent, whether you keep sheep or not, as young stock of other descriptions cannot be kept in the paddocks without something more than the ordinary fences we used to have. When fallowing, before I kept sheep I had to go over the land with the harrows to knock down the buck-bush, dry grass, and stubble, but sheep save this trouble and help to keep the land clean besides manuring the land more evenly than other stock. I do not advocate putting the whole flock on the fallow. My practice is to shear early and put in sufficient sheep to keep the rubbish from seeding, the others are put in the paddock to be fallowed the following season. If the whole flock is put on to the fallow at times to feed it down, they will carry a lot of seed in their wool and make the land dirty again. Many farmers do not take sufficient care in removing sheep from an "oaty" paddock on to the fallow. One hundred ewes will be sufficient for breeding purposes, and, with proper management, these will give you 75 per

cent. to 100 per cent. of lambs. Cull out the oldest and worst-woolled sheep, and replace with young stock. Do not breed from ewes until they are four-tooth. Do not breed out of the ordinary season, or overstock. A small stock well fed is better than a large one poorly fed. From 1892 to 1896 my flock of 100 ewe gave me a net annual return of £25 besides providing meat for the household, and clearing the land. The Merino is about the best breed for the district. I consider no farm complete without three or four cows, and a few pigs and fowls. I keep about 150 fowls, and find them a source of profit.

Members considered four paddocks insufficient where sheep are kept, as horses and sheep should not be allowed to graze together, as the horses did not do well. Mr. Mills, however, said his did very well running in the same paddock with the sheep. Members were of opinion that if more than 150 acres could not be fallowed by eight horses, without their shoulders getting in bad condition, it showed bad management and neglect. A visitor asked whether a five-wire fence was not sufficient. The Chairman said it might keep sheep in, but the lambs would get through. The little cost and trouble of putting in an additional wire was so small that it was not worth while trying to do with less. A good sheep-proof fence should be 3ft. 4in. high, with a barbed wire on top. In reply to question, the Chairman and Mr. H. Gray said they had used No. 10 wire for the two bottom wires, but were not satisfied with it, and would use nothing smaller than No. 8. All members recognised the necessity for sheep-proof fencing the paddocks if they are to be cleaned close to the fence, otherwise the sheep will clean to within about a chain of the fence, and then crawl under the wires to get at the better feed on the other side, leaving the margin of the field dirty, in consequence of which the seed is distributed all over the field at harvesting.

**HORSE COMPLAINT.**—A member reported that one of his horses has been unwell for some time, and is gradually getting worse. The symptoms were frequent staling (which left a whitish sediment on the ground), dullness and sluggish. The horse is five years old, and a heavy drinker. [The thirst is caused by feverish condition. The frequent staling is most probably due to kidney trouble, but what is really the matter could only be ascertained by a veterinary surgeon.—GEN. SEC.]

### Meadows, October 4.

Present.—Messrs. J. Catt (Chairman), T. B. Brooks, T. A. Buttery, S. Lawrence, D. Tester, W. Collins, W. Nicolle, W. A. Sunman (Hon. Sec.), and one visitor.

**CALVES DYING.**—The Hon. Sec. reported that his calves were dying from some disease new to him. The symptoms were swelling of the jaws, bleeding from the nose, and passing of blood. Members had no experience of this complaint. [It is impossible to give any information on such matters without fuller particulars as to course of complaint, age and condition of animals, feed, &c.—GEN. SEC.]

**SHEEP.**—Mr. Nicolle read a short paper on this subject. He thought it would pay small farmers to keep a few sheep if only on account of the saving in the meat bill. The fat can be exchanged for candles and soap, the skins are worth up to 5s., according to the quantity and quality of the wool, and the land is kept cleaner and in better condition. With scrub country that is not rough, if the timber is cut and burnt with other rubbish, and sheep put on the land, they will keep the scrub from growing again and the grass will improve. If we go in for rearing sheep or lambs for market or for wool, we must have several paddocks, and pay more attention to details, selecting only the best of the ewes to mate with good rams, and continually culling out the worst of the flock and replacing with the best of the young stock. For lambs for market the Merino, crossed with the Shropshire or Southdown, will give large lambs which mature quickly.

### Forest Range, October 7.

Present—Messrs. J. Vickers (Chairman), R. Townsend, J. Sharpe, G. Monks, A. Green, J. Green, H. Caldicott, J. G. Rogers, H. Waters, S. G. Collins, C. Stafford, W. Cherryman, J. Fry, R. M. Hackett (Hon. Sec.), and twelve visitors.

**PRUNING.**—Mr J. C. Grasby, of Balhannah, read the following paper on "Pruning Fruit Trees":—

In dealing with the question of pruning, it is necessary to consider first the object to be attained—to procure a tree capable of carrying a crop of fruit without breaking. Trees left to themselves naturally run to top, the lower branches gradually becoming broken while the top becomes overburdened and frequently breaks down. Pruning renders it possible to train a tree to almost any shape required: by means of pruning the principal branches of the tree are furnished with fruit spurs throughout the whole length. This is most noticeable in stone fruit, especially peaches, which, if left unpruned, very soon run themselves out, and bear only on the tips of the straggling branches. Pruning renders the fructification more equal, for, by removing the superabundant buds and branches, we contribute to the formation of new fruit buds for the next season. It also conduces to the production of fine and more saleable fruit. Having considered the objects of pruning, it is necessary to consider the system most suitable for soil and climate. What are the objects to be attained? To procure a tree capable of bearing a good regular crop, easily worked round, fruit within reach so as to be economically sprayed and gathered without the use of ladders, and also that fruit infested with codlin moth may be regularly gathered and destroyed. In order to get a tree to conform to the general principles here laid down, it will be necessary, on planting, to head them down to about 18in. in height, the first year from three to five shoots should be allowed to grow unchecked, the next year these should be cast back to say 3in to 6in. In trees of upright growth the leading bud should point outwards; this should supply six or eight shoots next year, which should again be shortened as before. The following or third year should give sufficient main branches to form a good tree. All the lateral branches should be spur-pruned, if possible, in the summer, so as to develop fruit buds. By this system we should be able to get a tree at four years old that would develop into a stiff, open, although upright tree, capable of carrying a heavy crop without breaking, and more easily worked with cultivators than if allowed to spread and bend with the weight of the fruit. In pruning my old trees, where it was possible I have shortened them all back, which has had the effect of filling up the lower part of the trees, and, in many cases, I have taken out the leading centre completely for the purpose of forming a more spreading open tree. The above method refers more particularly to apples and pears. Plums require more wood and less cutting. Cherries, after the tree is formed, the less cutting they have the better; but should be well headed back at first, so as to get plenty of branches. With regard to peaches, it is hardly possible to cut too much wood away. After the tree is formed cut out every other shoot, and cut back the remainder to a third, will be found a good general rule. When peaches are allowed to over-bear, the fruit soon becomes small, and the tree soon gets feeble, and the best thing is to cut it right back and form a fresh head.

Mr Monks agreed with Mr Grasby as to treatment of apricots and peaches, but thought the continued pruning of apple trees took more out of the ground for less fruit. Intense pruning was made too much of; he did not think it possible to regulate the crop. Apples from pruned trees did not keep so well as from old unpruned trees. It was only the presence of the codlin moth that led the Tasmanian growers to heading back their trees. Mr. Collins wished to know whether Mr. Grasby would cut the shoots away entirely where they are too thick, or leave a spur. Mr. Sharpe said his unpruned peach trees bore regular crops. It did not pay to cut the tops out of the apples; prune for the first three or four years, and then leave them alone. If you continue to prune the trees are filled up too much to get good colored fruit. The best fruit was obtained from the top; the trees did not grow much after reaching about 20ft. He liked to have large well-balanced trees with cross limbs removed. It was more difficult to cultivate where you have dwarf trees. Mr. A. Green said trees with only 15in. to 18in. of stem would touch the ground on sidings. His Winter Pearmain on the top of the trees were well colored, and of good quality; but those on the lower limbs, though left on nearly a month longer, were practically of no value. He found that the more air they got the better the fruit. Mr. J. Green considered that the amount of work attached to systematic pruning made it unprofitable. Mr. H. Green said with trees starting to branch at 18in. worse work in cultivation was impossible. Mr. Vickers said he found that trees pruned as suggested by Mr. Grasby, did not interfere with cultivating operations to any

extent, besides which we must bring our trees down for convenience in spraying. He was the first in this district to spray, and found it did not pay to treat tall trees. In reply, Mr. Grasby said he could not see what greater tax there could be on the soil than for the trees to grow vigorously, bear heavily, and break down with the weight of the fruit. By pruning, the trees begin to bear in about four years, and the useless superabundant growth being cut out, they keep growing and bearing, and there was no fear of soft fruit. It is impossible to remodel the trees without sacrificing three years' crops. Three years ago he cut down some Winter Pearmain which bore about 20 bush. per tree each alternate year. These were now bearing moderate crops. Strawberry Pippins cut down earlier now bore evenly. If the branches are started at about 18 in. from the ground they are stronger, and do not bend over. Which interfered most with cultivating? Such trees or unpruned trees with limbs bending to the ground with the weight of the fruit at the end? By setting the draught of the plough well over he could cultivate under the trees. The trees should be shaped like a wine-glass, and would not interfere with the plough. If cutting the shoots right away appeared too severe, leave a few to grow until the tree begins to bear, and then cut them down. If there are too many upright stems take some right out. Their object should be to get the trees to grow to the shape the Dunn's Seedling does naturally. The extra yield per acre from properly-pruned trees makes it profitable to apply bonedust to keep the soil in good condition. Root-pruning is only necessary if the trees run too much to head. In summer-pruning, snipping off the points is no good, as clean cuts cause fresh shoots. Place the knife against the wood and break it off, this will cause the formation of fruit spurs. Summer-pruning of apples should be confined to lateral growths, leaving the upright shoots for winter treatment. He might mention that last season he picked fruit straight from pruned trees for export to England, and realised 4s. per case clear; there was practically no waste fruit. He considered Ribston Pippins and Dunn's Seedlings two of the best apples to send to England; Hoover was useless for this purpose.

EXHIBITS.—Mr. Monks tabled raspberry canes of present season's growth, about 16 in. long. Mr. Sharpe tabled brown oats, 4 ft. high, with from 150 to 200 stools on each.

### Pyap, October 1.

Present—Messrs. K. F. Huselius (Chairman), G. Clarke, H. Mills, W. Axon, J. Aird, J. Harrington, T. Smith, C. Billett, B. T. H. Cox, E. Robinson, W. C. Rodgers (Hon. Sec.), and two visitors.

TOMATOES.—In reply to question, the Chairman said tomato plants should be set out when about 3 in. high. If left longer they run up too much and get too high before they flower, and in consequence the fruit has not sufficient shelter. Mr. Harrington said as the young plants require shelter, it is a very good plan to sow wheat or broad beans round the tomato plot.

VEGETABLES FOR SEED.—Mr. Aird asked whether it was necessary to transplant melons in order to get good seed. Cabbages, cauliflowers, and lettuces should have the stump slit down after the heart has been cut off, and then be transplanted. Turnips, carrots, parsnips, and onions should be transplanted in order to get the best seed. [There is more tradition than anything else in this notion. How can the transplanting have any effect on the seed? It may cause the plants to run to seed more freely, and later so as to escape cross-fertilisation.—GEN. SEC.] Members were of opinion that manure for vegetables should be well rotted before being used in the garden, as the germinating power of seed is injured by fresh manure.

CITRUS TREES.—Mr. Clarke said young citrus trees from stiff or clay soil should have the ball of earth broken when planting in loose sandy soil. When

the young trees require manure, dig a trench round about 18in from the stem, put in a layer of sheep manure, then soil, another layer of manure, and so on till filled up, then water well. The lower shoots, as well as the water shoots should be removed. By judicious pruning larger and better fruit was obtained. By thinning out the fruit, the remainder is greatly benefited.

### Millicent, October 7.

Present—Messrs R. Campbell (Chairman), A. McRostic, H. Hart, H. A. Stewart, G. Mutton, H. Oberlander, H. Holzgreffe, W. J. Whennen, and S. J. Stuckey.

**RYE.**—In reply to inquiry from Penola Branch *re* harvesting rye for hay, members were of opinion that it should be cut just as it has finished flowering. Except where other cereals will not grow, they would not recommend rye for hay; wheat on the green side is much preferable. Rye is generally grown for green feed, and, if put in in time to catch the first rains, good results are generally obtained.

**RAINFALL.**—Recorded for September, 2·870in. Crops generally look well.

**FLOUR MILL.**—Members thought as there was so much demand for roller flour it was a pity they had no plant in the district. The local miller, on being communicated with, said he would prefer to dispose of the mill to someone else to put in new machinery. It was considered that the oats grown in the district were not sufficiently good for oatmeal.

**STRAY SHEEP.**—A long discussion took place on the question of the best means of dealing with the strange sheep so that their owners might get them back, but nothing definite was decided on.

### Robertstown, October 6.

Present—Messrs. N. Westphalen (Chairman), A. Day, W. Armstrong, W. Mosey, A. Hempil, A. Rhode G. Dalatz, and B. A. McCaffrey (Hon. Sec.).

**BLACK RUST.**—Mr. Day said he noticed black rust (*Urocystus oculata*) generally appears before the head forms on their light soils; but in the south he had seen it on matured plants. It was suggested that members should take special notice this year, and if any black rust is found samples should be sent to the Central Bureau. [Why?—GEN. SEC.]

**SALT PATCHES.**—A long discussion on the use of gypsum on salt patches took place. The Hon. Sec. promised to try some experiments this year. He also mentioned that gypsum was kept in the stables at the Roseworthy College, and a small quantity sprinkled on the floors daily. This was done to prevent the escape of ammonia from the manure, and to sweeten the stables.

**WEED DESTROYER.**—Mr. Armstrong said he had experimented with half a pound of bluestone dissolved in 2galls. of warm water, poured it on to plants of thistle and sheepweed. It was very successful, and did not appear to injure the wheat plant. Members reported that the red poppy was appearing in the crops this year. [Carbonate of soda is very poisonous to plants, and if dissolved in water with white arsenic, then heavily diluted with water, it may be used on large patches of weed —GEN. SEC.]

### Albert, October 2.

Present—Messrs. J. Wetherall (Chairman), H. Smith, G. Acres, G. Haggard, J. Gill, J. Fahey, W. H. Edwards (Hon. Sec.), and one visitor.

**FRUIT PEST.**—Members reported that the apricot trees at Moorook and New

Residence Settlements were attacked by a thin "grub" which bores a hole into the young green fruit, eats the kernel, and then leaves the fruit. This is causing considerable loss of fruit, and members desired advice as to preventive measures to be adopted. [Try spraying trees with 1oz. Paris green and 1lb. fresh lime in 10galls. of water. It is impossible to give satisfactory advice on such matters unless specimens of the insects are forwarded—GEN. SEC.]

### Murray Bridge, October 9.

Present—Messrs. F. H. Wurm (Chairman), W. Lehmann, J. H. Thiele, J. J. Stecker, H. Schubert, W. Schubert, J. G. Jaensch, H. Block, B. Bretag, B. Jaensch, J. Cowan, W. H. Wundersitz, J. G. Newmann, R. Edwards (Hon. Sec.), and six visitors.

MANURING.—Mr. H. Schubert said he had tried coating seed wheat with superphosphate before sowing, with the result that very few of the grains germinated. While the grain was wet from pickling, he mixed superphosphate with it, and allowed it to dry before sowing. The soil was dry at time of sowing, but had a good fall of rain occurred he thought result might have been different. He was of opinion that drilling the seed in with superphosphate on dry limestone soil would result in failure. Mr. F. Wurm, sen., said on many farms on Yorke's Peninsula he had known of the seed being put in with the superphosphate on soil largely composed of limestone, and it remained in the soil weeks before germinating; but he had never heard of any serious damage being done to the grain. Mr. J. G. Jaensch and others said their experiences were the same as Mr. Schubert's. Mr. Lehmann said a large farmer in Victoria used "phosphate" guano instead of superphosphate with very satisfactory results. Members pointed out, however, that the latter was far stronger and more likely to have an injurious effect on the grain.

FRUITGROWING.—Mr. F. Wurm, sen., of Stansbury, gave an instructive address on this subject, and dealt with the preparation of the soil, planting, pruning, preserving, &c.

### Willunga, October 9.

Present—Messrs. W. J. Blacker, M.P., Jno. Binney, W. J. Binney, A. Slade, Jas. Valentine, Jno. Allen, C. Bray (Hon. Sec.), and one visitor.

CEREAL EXPERIMENTS.—Mr. W. J. Binney tabled several varieties of wheat, one of barley, and one of flax, all of which looked remarkably well. He reported having about 100 varieties of wheat under trial, all of which were doing well.

MANURING.—Considerable discussion took place on the value of manures for cereals, members being of opinion that the outlay on manures would be handsomely repaid.

STRIPPER V. BINDER.—It was unanimously agreed that the twine-binder and header should be used in preference to the stripper for harvesting grain.

### Onetree Hill, October 8.

Present—Messrs. Jno. Bowman (Chairman), A. Adams, F. Barritt, H. H. Blackham, F. Bowman, Geo. Bowman, J. Flower, J. S. Harvey, F. L. Ifould, W. Kelly, E. A. Kelly, J. Hogarth, A. Thomas, J. Lucas (Hon. Sec.), Professor W. Lowrie, and about forty visitors.

**SEED EXPERIMENTS.**—Mr. Adams showed sample of Dart's Imperial wheat sown on April 23. The plants were nearly 4ft high, of healthy growth, and good ear.

**MANURING.**—Professor Lowrie gave a very instructive address on this subject, of which the following is an abstract:—

Farmers now gave much more attention to this question, and their interest was still growing. What was necessary to make a success of manuring was to ascertain by experiment and scientific research what essentials to plant life were wanting in their respective soils, and to supply deficiencies with the best fertilisers available. The elements of plant food must necessarily be exhausted by continuous cropping unless replaced by some artificial agency. Nitrates were most valuable, and here in our drier climate they were not so liable to be washed out of the soil as in Europe, consequently such heavy dressings were not required. From 1cwt. to 1½cwt. per acre would be found sufficient for a haycrop in South Australia, whereas in Europe they applied from 2cwts. to 4cwts. Our farmers made a mistake in being too economical, and using this manure too sparingly. Phosphates were necessary for the production of vigorous growth, but their continued use alone helped the crops to take out the nitrates from the soil, and consequently had a similar effect in the end to overcropping. In this respect only was the soil exhausted by manuring with phosphates. The various commercial fertilisers on the market were referred to, and their values and relative cost dealt with. Bonedust was highly recommended, but, for quick returns, it must be finely powdered and drilled in with the seed. Nitrogenous manures, such as sulphate of ammonia and nitrate of soda, most readily replaced the nitrates removed by the crop; but bonedust had a more lasting effect. Steamed bones gave a maximum of phosphate of lime, the fatty matter in unsteamed bones resisted the action of moisture, and thus impaired its efficiency. Mineral superphosphates of standard quality answered well. The slag resulting from the manufacture of steel contained phosphoric acid, but the quality depended upon the contents of the flux used in smelting. It needed to be very finely ground, or it would be years before the soil would respond to its presence. For light soils potash manures were very valuable. More use would be made of woodashes were farmers more generally aware of their fertilising properties. It would be practically useless, however, on strong soils, and should generally be used only when the soil failed to respond to manuring with superphosphate. It was a mistake to manure too lightly. From 80lbs. to 112lbs. of phosphates was the usual dressing; but it would be more profitable to double that for hay. Occasionally such a dressing might prove too heavy for a wheat crop, and, again, the rainfall may not be sufficient to enable the manure to be utilised by the crop; but in this case it remained in the soil for the next crop. A mixture of 1½cwt. of superphosphate and ½cwt. of nitrate of soda would be found to give good returns. Where the rainfall is light, special care must be taken that the soil is well worked. A mistake was made in neglecting farmyard manure. It kept the land more open, and its organic matter held the moisture. It was folly to let it go to waste. Rocks containing a sufficiently high percentage of phosphoric acid, to be profitably dealt with, had not been discovered in South Australia. (On some parts of Yorke's Peninsula low grade deposits which might pay for local use had been found, and prospecting for other and better supplies was being vigorously prosecuted. Lime was not a manure. It was used to make heavy clay soils friable, and to release the plant food in them. It is used in large quantities for this purpose—from 1 to 10 tons per acre.)

**TURKEYS.**—Mr. Barrett called attention to error in page 290 of the *October Journal* in his paper on Turkeys. He recommended crossing the bronzewing cock on black hens, and not the reverse as stated.

### Kanmantoo, October 8.

**Present.**—Messrs. Jno. Downing (in chair), F. Lehmann, J. Hair, J. Mullins, T. Hawthorne, E. Downing, A. Hair, P. Lewis, H. Werner, and W. G. Mills (Hon. Sec.).

**PAPER.**—Mr. Lehmann read a short paper on "The Value of Observation to the Farmer." He considered it necessary for every farmer to cultivate to the utmost his faculty of observation. Observation made people practical. The farmer who observes and thinks for himself is more independent than others. In buying land, the color and texture of the soil, position, vegetation, &c., have all to be considered, and unless the farmer is observant he is likely to make mistakes. The same thing applies to stock as well as to other things, such as purchasing machinery, manures, and so on. Farmers should cultivate a taste for reading. Study all the agricultural papers, and pick out the items which

may benefit them or the district. Young folks should study such subjects as geology, chemistry, botany, and mechanics. The study of the laws and principles relating to the growth of plants and the working of machinery would be of immense benefit to them in after life. The Chairman agreed with Mr. Lehmann and stated that in America scientific knowledge was disseminated by the managers and officers of the experiment stations going through their respective districts lecturing on various subjects, and giving practical lessons to the younger people. Mr. Lehmann said, in regard to manuring, the different soils required different treatment; and, to make a success, it was necessary for the farmer to understand the requirements of each, and this would only be gained by continual observation. A suggestion was made that some of the leading stockbreeders should be approached with a view to getting lectures or advice upon breeding and treating of stock suited to different localities.

**DAIRYING.**—Considerable discussion took place on this subject with particular reference to the improved methods adopted. Mr. J. Hair said he read an account of a model dairy farm in Victoria where everything was done on the most approved style, and the profits were very considerable.

**BRANDS ON SHEEP.**—Mr. Lehmann inquired the best width to have sheep brands. The general opinion was that  $\frac{1}{2}$  in. wide was most suitable. Some members thought ear marks should be registered, as the brands often come off. A discussion ensued on the best material to use for branding. Various mixtures are used in this district, including paint and tar, but both of these were considered to be injurious to the wool. A mixture of linseed oil, lamp-black, and flour or whiting was considered good.

**ROLLING LAND.**—Mr. Lehmann said he found it a good plan to have a box on top of his roller, so that when rolling the land the roots and stones, if there were only a limited number, could be picked up. The stones could be tipped into the watercourses or on to the ends. Members considered this plan, which had been previously advocated by the Branch, a good one.

### **Finniss, October 4.**

Present—Messrs. A. Willcock (Chairman), T. R. Sumner, W. W. Heath, S. Eagle, H. Langrehr, W. T. L. Heath, S. Collett, and T. Collett (Hon. Sec.).

**OFFICERS.**—Messrs T. Collett and S. Collett were elected Chairman and Hon. Sec. respectively for ensuing year.

**VISIT TO GARDEN.**—This meeting was held at Mr. S. Collett's residence, the fruit garden being inspected by the members, who were impressed by the very healthy appearance of the trees. Mr. Collett reported that Surthead Cabbage was rather coarse and not a first-class variety.

### **Redhill, October 11.**

Present—Messrs. F. Wheaton (Chairman), G. Wheaton, R. H. Siviour, L. R. Wake, D. Lithgow, A. Stone, A. A. Robertson, R. B. P. Bailey, A. Hill, S. H. Treloar, and T. McDonald (Hon. Sec.).

**BLACK RUST AND TAKEALL.**—Considerable discussion ensued on these two diseases of the wheat plant. Mr. Wheaton stated that black rust was prevalent in his crops, and asked if members could give any information as to the cause and remedy. Mr. Lithgow said his experience was that if the seed is sown when the land is dry the crop is more liable to the disease. Over-cultivation and too much cropping were also mentioned as causes, and it was stated that crops on loose soils were most liable to the disease, those on clay soils being seldom



attacked. Members came to the conclusion that the best preventive treatment was not to crop the land too often and not to sow when the soil is too dry. [The experience of members of other Branches as to starving the rust by cultivating leaf crops, root crops, legumes &c., also as to the varieties of wheats most liable to attack, and the influence of soil and cultivation on this disease, will be of great value.—GEN. SEC.]

**QUANTITY OF SEED TO SOW.**—Mr. Siviour initiated a discussion on this subject. He advocated fairly thin sowing, as likely to give best result. He contended that a crop of average thickness would produce better matured grain than a thick crop, and would not be so liable to blighting. He sowed  $\frac{3}{4}$  bush. per acre. Most of the members preferred thicker sowings, say from 1 bush. to  $1\frac{1}{4}$  bush. per acre.

**DRILLING IN SEED.**—In reply to question, Mr. Wheaton said that his crops, which were put in with the drill with manure, have made much greater growth, are standing the dry weather as well as the broadcasted crops, and are much freer from wild oats. He used about 90lbs. of superphosphate and 30lbs. of Thomas phosphate per acre. The best crop he has, however, was put in with the drill, but not manured, on land that had been resting for several years.

### Belair, October 2.

Present—Messrs. Alex. Murray (Chairman), W. H. Sanders, G. R. Laffer (Hon. Sec.), and one visitor.

**BRANCH SHOW.**—It was decided to unite with Cherry Gardens and Clarendon Branches and hold a combined show of the products of the district next March.

### Nantawarra, October 11.

Present—Messrs. S. Sleep (Chairman), E. J. Herbert, A. L. Greenshields, E. Pridham, J. W. Dall, J. Nicholls, A. Herbert, C. Belling, T. Dixon (Hon. Sec.), A. Steinwedel, and C. L. Reuter (Balaklava Branch), and two visitors.

**MANURING.**—Members inspected a number of crops in the district for the purpose of seeing the results of the use of the seed and manure drill. The first crop inspected belonged to Mr. Frost, and was of the Steinwedel wheat drilled in dry with 80lbs. superphosphate and 20lbs. of wood ashes per acre. The ashes were added principally to make the super. work freely through the drill. The crop was just coming into ear, and was looking fairly well considering the unseasonable weather. Adjoining this was a crop drilled in with 100lbs. of Thomas phosphate per acre: this was shorter in the straw than the previous lot, but superior to the broadcasted crop alongside. Members thought the drilled portions would yield nearly double the broadcasted. Mr. Dixon's crop, drilled in with 40lbs. red wheat and a mixture of 90lbs. superphosphate and 24lbs. of dry wood ashes, was next visited. This being a later variety is not yet coming into ear, and is showing the effects of the cutting winds and absence of rain. A strip right through the paddock which was drilled in without manure is very much poorer. Where 100lbs. Thomas phosphate was used the crop was not so good. Portion of it is very dirty with "wild mustard," and will consequently be cut at once for ensilage. The next paddock, belonging to Mr. Frost, was drilled in with superphosphate and ashes, but did not look so well as those previously inspected. The owner could not account for the difference in result from exactly similar treatment. Next was a paddock on which 40lbs. Purple Straw wheat was drilled in with 80lbs. superphosphate and 20lbs. wood ash, on which the crop looks quite 50 per cent. better than a broadcast crop alongside; on the west side a land was drilled in without manure, and then came the same wheat drilled in with 100lbs. Thomas

phosphate per acre. At one end, where the soil consisted of stiff clay and sand, the crop looked as well as where the superphosphate was used, but on the other end it was little better than the broadcasted. Another paddock of rubbly nature was sown with Steinwedel wheat and superphosphate the same as previous crop. The wheat was nicely out in ear and much better than an adjoining crop where Thomas phosphate was used. On some patches where the water had run a very heavy crop of hay could be cut. Further down the same paddock was a plot drilled in without manure, which some members considered inferior to the broadcasted crops. All these crops were on fallow land, which was sown dry, and consequently most of them were weedy in the bottom. The next paddock visited, which was cropped last year, was partly manured with farmyard manure and part with superphosphate. It was very full of wild oats, but on the drilled portion the wheat stood well above the oats and could be reaped fairly clean if needed. Most of it, however, is to be cut for hay, and members estimated that it would yield a ton to the acre. In the evening Mr. Steinwedel expressed himself as being very well pleased with what he had seen during the day. He was convinced that on the limestone soil superphosphate was superior to Thomas phosphate, but the latter would pay to use on the heavier clays. From what they had seen it was evident that the drilled manured crops got a good start of the weeds, and this alone was a considerable advantage. He had been using manures for fifteen years, and found that even when he did not get sufficient from the crop to pay the expenses the improvement of the grass made it up; not only did more feed grow, but stock seemed to do better on it. He advised using lime on heavy soils.

**FIELD TRIAL SOCIETY.**—Matters in connection with the Northern Yorke's Peninsula Field Trial Society were dealt with.

**EXPORT OF FRUIT.**—Mr. Dall mentioned that owing to low prices obtained for fruit exported to England last season many growers did not clear more than 3s. 6d. per case.

### Kapunda, October 9.

Present—Messrs G. Teagle (in chair), H. T. Morris, M. Hansbury, Pat Kerin, Peter Kerin, H. King, and T. Jeffs (Hon. Sec.).

**BUSINESS.**—It was decided to allow the proposed field trial of seed drills to stand over until early next season. Some discussion took place concerning the disposal of the Jersey bulls purchased by the Government.

### Arthurton, October 7.

Present—Messrs. W. Short (Chairman), W. H. Hawke, W. Smith, M. Lomman, H. Short, H. Freeman, J. Pearson, J. Koch, C. Koch, J. B. Rowe (Hon. Sec.), and two visitors.

**MANURING.**—This meeting was held at the residence of Mr. J. Koch, and after inspecting the well-appointed outbuildings a profitable time was spent in inspecting the crops, most of which have been put in with the seed and manure drill. Some portions were drilled in without manure, and the difference between the manured and unmanured crops was very noticeable. Members agreed that where the crop was put in with the drill manure should also be used.

**FIELD TRIALS.**—Considerable discussion took place on the forthcoming field trial of harvesting implements. Mr. Barr's paper on "Judging by Points" was also discussed. Members did not entirely agree with Mr. Barr, and thought the judging at the previous trial satisfactory.

**RAINFALL.**—Recorded by Mr. Short for September, 2·112in.; for nine months, 11·454in.; by Mr Hawke, at Tiparra, 2·065in. and 11·022in. respectively.

### Mount Gambier, October 9.

**Present**—Messrs. J. Umpherston (Chairman), G. G. Collins, D. Norman, sen., A. J. Wedd, T. H. Williams, W. Mitchell M. C. Wilson, James Bowd, J. Dyke, Thomas Edwards, W. Barrows, and E. Lewis (Hon. Sec.).

**CONGRESS**—The Chairman stated that the recent Congress of the Agricultural Bureau in Adelaide was the most successful that had been held.

**ANALYSES.**—Mr. Mitchell referred in eulogistic terms to the conduct of the *Journal of Agriculture and Industry*: but, in reference to a paragraph stating that the School of Mines would undertake analyses for Branches of the Bureau at a charge of 3s. for each matter contained in the substance analysed, considered the charge to be excessive.

**CODLIN MOTH.**—Mr. T. H. Williams read a paper on this subject, in which he referred to the opinions entertained by Professors Washburn, Shugerland, R. C. Kedzie, Mr. Charles French, Mr. S. Olliff, Miss Eleanor A. Ormerod, and others. It was resolved to discuss the paper on a future occasion.

### Quorn, October 13.

**Present**—Messrs. J. B. Rowe (Chairman), F. Herde, James Cook, C. Patten, R. Thompson, and A. F. Noll (Hon. Sec.).

**USE AND PRESERVATION OF FARM IMPLEMENTS.**—Mr. R. Thompson read a paper to the following effect:—

Sheds are almost as necessary as the implements and machinery. Straw-covered sheds are the coolest, but neither dry nor fireproof; therefore, iron roofs are preferable, especially as they afford a good catchment area for rainwater. When machinery and implements are not in use they should be cleaned thoroughly—especially twinebinders, which have so many bearings. Whilst the grease, &c., is fresh and soft it can be removed in a very short time, but not so when it has become hard and dry. All necessary repairs should be done at once, and all extra parts supplied. It is too late to do these things at the time the machine is required to go to work. It is a great mistake to leave such things until the last day, and then rush off to the machinist, who will most probably be over-burdened with work, and unable to give that strict attention and careful work to the job which he would be able to devote to it when he has more leisure. Cleaning and painting are both very necessary to the life of implements, &c. He would paint first coat with red lead and boiled oil, not much turpentine, ground in a paint mill or on a flagstone with a round rubber. Give felloes and naves of wheels one coat, then stop all cracks with white lead and red lead mixed as a putty, then give two coats all over, paint the nave-bands black, also the under carriage, shafts, and bearings, and the top part of a waggon drab or slate, as yellow, green, and blue do not stand well. The durability of lead paint more than compensates for the brightness of the other colors. Attention to bolts and nuts is a most important matter. If the ends of timber in a waggon or machine split, put a bolt or screw through, and before painting give a good coating of oil on the end grain. He would not use oil and grease to excess on cogwheels, but would use more black lead mixed with a little water, and apply with a small paintbrush. No sand or grit will then lodge on the cogs, and they will work more freely, with less draught. This should be tried on the working parts of stump-jump ploughs and scarifiers. All woodwork of machinery, &c., should be painted every second year. Ploughs, scarifiers and harrows are all the better for paint, and afford a convenient object-lesson upon which the boys can practice. All handles of pitchforks, spades, shovels, picks, &c., should be well rubbed several times a year with raw linseed oil.

In a lengthy discussion it was shown that turpentine is detrimental to paint in a hot climate, and its use is forbidden on all Government works, except where smoke, &c., renders its use absolutely necessary. Lead paints, mixed with linseed and boiled oils, are most durable. For iron troughing, coal tar and pitch are recommended.

**Dawson, October 9.**

Present—Messrs. R. Renton (Chairman), J. Collins, S. Chapman, C. W. Dowden, C. F. W. Just, W. Kelly, J. Kensley, C. H. Meyers, F. Schibella, A. F. Dempsey (Hon. Sec.), and four visitors.

STATE DAIRY BULLS.—Considerable discussion took place upon this subject. It was decided to apply to the Department of Agriculture for the loan of a Jersey bull. Members greatly approved of the action of the Minister in providing the animals. The drought and famine of last season has so considerably reduced the number of cattle (particularly bulls) that the time is very opportune for the introduction of new blood. The prospects of the present season show that farmers must not place dependence entirely on wheat-growing.

**Crystal Brook, October 9.**

Present—Messrs. W. J. Venning (Chairman), W. Hamlyn, J. C. Symons, J. Allen, Jas. Forgon, E. Pope, W. Morrish, and George Miell (Hon. Sec.).

NORTHERN AMALGAMATED BUREAU'S FIELD TRIALS SOCIETY.—Delegates from the various branches attended, and the business of this meeting was devoted to details connected with the establishment of the Field Trials Society. Officers were appointed as follows:—Messrs. W. J. Venning (Crystal Brook), president; the chairmen of the various branches connected with the society to be vice-presidents: Geo. Miell (Hon. Sec.); W. Hamlyn (Crystal Brook), treasurer: J. Darley (Narridy) and P. J. Spain (Port Pirie) auditors. Power to add other branches was provided. Rules were adopted.

**Balaklava, October 9.**

Present—Messrs. C. L. Renter (Chairman), J. Willmott, G. Reid, E. Roberts, A. Steinwedel, J. Vivian, J. Mills, S. Fisher, A. Manly, W. H. Thompson, A. Hildebrand, and E. M. Sage (Hon. Sec.).

ASPHODEL.—Mr. Steinwedel tabled plants of *Asphodelus fistulosus*, or "wild onion," found near the township. Hon. Sec. to direct attention of District Council to this weed, which has been declared under the Act.

INDIGENOUS FODDER PLANTS.—Mr. Willmott showed ten specimens of various indigenous plants which are eaten by livestock. These were sent to him by Mr. Halford, of near Koorunga, who gave only the teamsters' names of the plants, such as "Black Oak," "Sandalwood," "Dog Wood," "Beef Tree," "Pod Shrub," "Salt Blue Bush," "Blue Bush," "Salt Bush," &c.

SCHOOL AGRONOMY PLOTS.—Members inspected the experimental plots cultivated by the scholars. The soil was very dry and hard, and the plants were suffering from dry weather. Two plots of white Tuscan wheat, one sown with plump grain, and the other with shrivelled, appeared equally strong and healthy.

AGRONOMY IN SCHOOL TEACHING.—Mr. J. Willmott read the following paper:—

In an essentially agricultural country like ours the teaching of Agronomy needs no apology. Still, a few reasons why it should be taken up wherever practicable may be stated. The subject is one of ever-increasing interest of itself. As a good deal of the work must necessarily be done out of doors, the change of occupation and the fresh air will tend to promote more geniality between teacher and scholar, and will not only afford present gratification, but will counteract a tendency to tediousness in the ordinary work. It will result in steadily increasing benefit to the scholars, the neighborhood, and the colony. South Australia has a splendid climate, abundance of arable land, and but a small population.

For quality, her produce comes into the first rank. It is but right that her children in early life should be imbued with some knowledge of the wonderful resources of the soil. Agriculture

is the backbone of a national prosperity, and all classes are dependent on the tiller of the soil. Consequently it is very important that children in a country district should have a bias in that direction; and, as the study and observation of the laws relating to the growth of plants is especially calculated to develop the children's perceptive faculties, arouse their interest, and encourage habits of thoughtfulness and method, the soubriquet, country "bumpkin," should soon become a meaningless term.

The cultivation of plots of ground in which cereals, fodder plants, fruit trees, &c., may be grown under varying conditions, will provide plenty of work for the children's hands, and scope for their powers of observation.

In order to illustrate the advantage to be gained by manuring, one half of a plot could be manured, or two plots similarly treated, and one manured and the other left unmanured. As wheat is our staple product, it is advisable to sow a number of different kinds, in order to notice their various styles of growth, time of coming to maturity, rust-resistant properties, and ability to withstand strong winds when ripening.

Summer fodder plants may also be dealt with, such as maize, sorghum, mangolds, kale, &c., and will often afford useful object-lessons to the farmers as well as to the children. I am convinced that a better knowledge of "What and how," in relation to summer fodders, will result in a large increase in the productiveness of the land in many districts, and its capacity to carry stock.

Where practicable a few fruit trees and vines may be planted. This branch of agriculture should be encouraged as much as possible. I have often been surprised, not only at the absence of fruit trees from many of the farms I have visited, but also at the quantity of fruit disposed of to farmers by local tradesmen and hawkers. Parcels containing a variety of seeds will be made up at reasonable rates by any seedsman.

Farmyard manure, sweepings of the poultry yard, ashes, firewood refuse, lime, can generally be obtained locally, while artificial manures may be got from seedsman or advertising agents. I believe that a reasonable number of tools will be supplied on application to the Education Department. The teacher should rely on his own resources as much as possible. While I think that Government should afford some assistance, it is a mistake to expect too much help in this direction. "Milking the Government cow" too much is an operation which is injurious to the tone of the school and the district. The expenses, which will not amount to very much in a year, may easily be met from the school funds, which are, in the majority of cases, supplied by local entertainments or donations. Some little return may be expected from the crops.

The bias which the children receive will have the tendency to increase the number of intelligent agriculturists in the future, and thus assist in developing the resources of our colony. A considerable amount of knowledge of plant life will be gained by the children, which will be not only interesting and profitable, but will be a useful stepping-stone to the secondary schools which are being established by the Government. I may be permitted to remark here that, as the establishment of secondary schools for agricultural education has met with marked success in older European countries, our Government has acted wisely in following their example. In a country so dependent upon the direct products of the soil as ours, every facility should be given for Agronomical instruction. Considering its educational value, its practical nature, and the advantages to be derived from an increased knowledge of the conditions necessary to successful plant culture, Agronomy should be more generally taught.

The paper was well discussed, members expressing the opinion that agronomical instruction for boys is very beneficial, since it is likely to develop the particular lines they are best suited for.

### Woodside, October 4.

Present—Messrs. R. Caldwell, M.P. (Chairman), J. H. Snell, J. W. Cuthbertson, C. W. Fowler, R. W. Kleinschmidt, A. Pfeiffer, J. Caldwell, jun., A. S. Hughes, E. Esau, R. P. Keddle, and G. F. Lauterbach (Hon. Sec.).

PLANT FOOD.—Mr. J. H. Snell read the following paper:—

Plants want food as much as animals do. They absorb and inspire it.

The first store of food is the seed. [As shown in an experiment exhibited.—GEN. SEC.] Where the plant has used all the food in the seed, there is only the skin left, like a bag. Here is one seed that germinated, and was then no longer supplied with water. It died, showing a supply of water is necessary to dissolve the plant food.

The second store of food is the soil. These plants now exhibited, that have only had the first store to draw from, are now dead or dying; those that have been put in soil are growing all right.

Now, if we can analyse the straw and wheat, we know what it must get from the soil or elsewhere; for if it be there, it must have been supplied to the plant.

The third store of food is the air. A portion of the plant food in the soil is active, and the rest dormant. We can make the dormant matter more active by cultivation. Roots must be able to spread easily; hence one reason for good cultivation. Soils liable to settle down hard require working. If a plant has to search round for the particular food it wants, it is at a standstill while searching for it. In the experiment which was exhibited, where wheat is growing on wadding, you can see how even wheatroots and rootlets search for food.

The seed, and the roots as well, want fresh air; and, as they cannot go to look for it, we must let it come to them. So they must not stand too thickly in the ground. If a crop looks sickly, we should try and find the reason. Every crop borrows largely from the soil, and if we do not pay back the material taken out, the land is sure to become poorer. The following substances are useful for plant growth:—Silica, phosphoric acid, carbonic acid, sulphuric acid, chlorine, alumina, lime, ammonia, potash, soda, magnesia, and iron.

Potash is left when vegetable matter is burnt; carbon is almost pure in coal or charcoal; carbonic acid is given off when vegetable matter is burnt, and goes off with the smoke, so that is one source of it in the air.

When the sun is shining, plants absorb carbonic acid from the air. The carbonic acid is composed of one part carbon and two parts oxygen. They appropriate the carbon, and set the oxygen free again. When we breathe we exhale more carbonic acid than we inhale. This is another source of carbonic acid in the air. Now, if we crowd the plants the air cannot circulate freely. Practical farmers will judge for themselves whether this is an argument for drilling or not.

Sulphuric acid will turn straw black, so it cannot be given to the plant in that form. Phosphorus combines with oxygen to form phosphoric acid, and then the phosphoric acid combines with potash to make phosphate of potash. Sulphur in this way forms sulphate of potash. In these forms phosphorus, sulphur, and potash can be supplied in a harmless form.

Salt contains soda and chlorine, and can be separated by sulphuric acid. The chlorine passes off as a yellowish gas, and the soda is left. Probably plants get the chlorine they want from the salt in the soil, and the soda also, as well as from other compounds of the soda.

Silica and alumina are both contained in white clay; the yellow clay also contains iron, which is a plant food. Lime is useful as a food, and also in other ways in the ground. With the lime in limestone, magnesia is often found, which is also a plant food. Then ammonia is in the manure heaps, giving the pungent smell.

The plant food must either be taken in water or as a gas.

A grain of wheat contains the germ, and also the food to feed the germ. The germ commences to make growth, and this we call germination. When a steady supply of water is given, diastase is found in the seed. The work this body has to do is to make the floury matter into sugar or gum, or something like it, so that it may be dissolved in water. I have removed seeds after they have started growth, and kept them in the air without water; and others, again, in earth and supplied water. The former are dead or dying, while the latter are growing.

Now, air is necessary to make a seed grow. If we could keep a seed without air, no matter how much we wet it, there will still be no growth. If only a little air gets to the seeds they may begin to grow, and then die for want of a further supply. This applies not only to the seeds, but also to the roots, after the plant food is used up in the seeds. Hence land should be loose and open for air to get in. In clay soils the seeds will be closely covered up, and air cannot get at them. The fact is, that many farmers do not know the full value of a good supply of air for helping plants in their growth. This is both above and below ground. It is of great value when the seed is in its early period, and continues to be useful up to the time when its growth is finished. The oxygen of the air is one of the most active agents in turning dormant matter into active plant food in the soil. Hence the value of letting it have free access by following. Whether this is an argument against rolling too heavily, I will leave the practical farmers to judge. If it closes up the soil so as to prevent the free circulation of air, I should judge it would be harmful. Again it seems to me a reason for harrowing a growing crop.

Oxygen is absolutely necessary to a plant during germination. We require oxygen to sustain life, and it is just as necessary to plants, and they get this from the air. The nitrogen in the air prevents the too rapid action of the oxygen.

By analysis we can ascertain the composition of plants, and so know what is necessary for them. Sometimes the knowledge of our particular soils will give a good idea of the plant food required, but often this can only be found by experimenting (for several years to be of value).

The following is the analysis of the ash of two tons of clover hay:—Potash, 52lbs.; soda, 7lbs.; magnesia, 35lbs.; lime, 111lbs.; phosphoric acid, 20lb.; sulphuric acid, 13lbs.; silica, 10lbs.; iron, 3lbs.; salt, 8lbs.—total, 259lbs. It seems from this that limestone land would be good for clover. Is this so?

Now, the analysis of the grain of wheatah is as follows:—Potash, 29.96; soda, 3.88; magnesia, 12.28; lime, 3.40; phosphoric acid, 45.88; sulphuric acid, .32; silica, 3.36; iron, .80; salt, .12. The carbonic acid and ammonia passed off with the smoke.

Phosphoric acid comes first with nearly forty-six parts out of a hundred; hence the value

of phosphates as artificial manures. Potash is next with nearly thirty parts. To show that this knowledge is made use of by practical farmers, and is not altogether theoretical, I have here the account of the farmers' visit to Roseworthy College, where the different manures are quoted. There muriate of potash, sulphate of ammonia, superphosphates, bonedust, and many other kinds of artificial manures are used. If we had the analysis of the others, as basic slag, guano, and kainit, we should no doubt see that they contain some of the substances shown to be in the ash of wheat. Although all crops require phosphoric acid, some want it in larger quantities than others. If we keep on growing crops which take large amounts of phosphoric acid, we find those crops growing smaller and smaller; but the land might be able to produce a larger crop of some other sort which did not need so much phosphoric acid. For instance, clover-ash gives about one-twelfth phosphoric acid, while wheat takes forty-six out of one hundred, or nearly half. Does this show that clover can follow wheat? In any case, it shows that manures containing phosphoric acid are needed for wheat lands.

Land is given a rest to enable it to recover. This really means giving air and carbonic acid a chance to turn some of the dormant plant food into active. But if the land lies flat and level there is less surface open to these gases; but when it is laid up as roughly as possible, the gases have a better chance to do their work. Frost also assists by breaking up the soil.

By changing the crops, farmers try to prevent growing bad crops by thus using different plant foods, or, if the same foods, using different quantities.

Manure is used to prevent crops from failing from want of proper food. But it is a waste of money to buy a manure that is not needed. Hence the necessity of finding out as soon as possible the kind of plant food wanted. This is much yet a matter of experiment; but I have no doubt the time is coming when farmers will know the exact plant food wanted, and be able to buy just the manure required. A good analysis of the soil should go far towards this, but cannot be very satisfactory till each one is able to analyse his soil for himself.

Anything grown on the land takes much of its food from the soil. If we return any part of a crop, we repay part of the loan. If, for instance, we grow a crop of wheat, and send part to market, but keep the straw until it is rotted, and then put that on the soil, we repay part of the loan. Then, artificial manures are required to pay back what has gone off in the wheat, &c., and this is the part that needs so much attention. Some manures simply whip the land into doing more work, and leave it quite exhausted afterwards.

Lime is even more useful as a help in making dormant matter active than as a food. This can easily be understood when we know carbonic acid is formed from lime, and know how important carbonic acid is to the plant. Our crops are very particular about their food, and compel us to make the supply of food perfect, or else to grow some crops for which there is proper food in the soil. Just as we know more fully what we have in any soil, so shall we be able to make them more suitable for the crops. But we cannot say what should be supplied to the soil unless, by careful analysis, we have previously learnt what it is that is really wanted.

Active tillage of the soil does, very generally, so far enrich the land that it becomes more capable of yielding a complete supply of food to our crops. The reason gardening gives better crops than ordinary ploughing is in many cases because of more perfect tillage. Instead of being half moved by the plough, it is thoroughly worked by the spade. This lets the air get into the land. In the air we have two gases at least that are friends to the farmers—oxygen and carbonic acid. As soon as they get in, they begin making dormant plant food active. When this work has gone on for a time, the farmer may plough the land over again, and then fresh earth is open to the air. So every ploughing helps to make more plant food. Then the rain and frost help. If you have never noticed how much change is made in the surface of a single lump of clay during a winter, you can scarcely know how much work is done in this way. Let a large piece of clay be placed on a flat stone before winter. The first frost will make it hard like stone. After a time it will thaw, and you will see it covered with a nice open earth. Another frost will go deeper, and after a time the lump of clay will become so fine and open that the gases will pass in and do their work. When the air cannot get into the soil, it always makes the land unable to grow good crops. We call such land poor and barren. This may not arise from any want of food necessary for the crops, but because the plant wants something more than food; it wants air to breathe. If we prevent air reaching the roots the growth is not good. When a soil is full of stagnant water (that is, water not moving) the air is kept out. Plants want water, but not too much, to allow of air passing properly into the soil. Hence the necessity for draining wet land. In passing through the soil air is robbed of all the ammonia in it, and this is left for plant food.

While farmyard manure is rotting, there is often great danger of losses while the change is taking place; but the skilful farmer tries to avoid such losses. Have you ever seen small black streams running away from a farmyard? There is one loss of good manure. Another loss is the ammonia passing away into the air. Because this loss is not seen, it is often not believed in. As I have shown, there can be very powerful gases where nothing is seen; the way to prevent this is for the farmers to direct the rotting.

Some persons who are not farmers imagine that if sheep and cattle feed on the crops this leaves the land richer and more fertile than ever. Now, it stands to reason, that when food is being used in assisting animal growth, it cannot build up and enlarge the body of the animal without adding to it some of its own parts; therefore there must be a smaller quantity left for

being returned to the land in the shape of manure. The use of any body as food causes some decrease in it, and cannot in any way increase it. Suppose, for example, we have a crop of clover, and we divide it into two equal portions; on one part the crop shall be eaten by sheep, and on the other the crop shall be ploughed into the land. The latter must receive most fertilising matter, because the sheep would make use of a portion to add to their bodies. The bones of the animal are built up of substances drawn from the soil. If plants could grow upon the soil, and if, when they had performed their duties, they could return to the land all the materials they had drawn from it, there would be no exhaustion of the soil. The analysis of bones shows organic matter, phosphoric acid, carbonic acid, lime, magnesia, soda, and potash. When we consider that all of these in greater or smaller quantities are taken from the soil by every animal, we need not be surprised that the land becomes poorer by their being taken away. Instead of bonedust, which is expensive, mineral phosphates are used. In some cases these are equally good.

The general object which good farmers try to secure is the continued growth of large crops of good quality.

No one can farm successfully without local experience, but there is no reason why a farmer should not know something more than this. When a man has had experience as a practical farmer, it will still be an advantage to him if he knows why his practice has been successful, and why in some cases it has failed. The farmer who knows how and when work should be done on his farm would look upon it with greater interest if he also knew why it should be done in that particular manner. If he had to farm in another kind of soil, and in another district, he would also be better able to learn the changes necessary. The more one knows of the principles of agriculture the more he is interested in farmwork. Farming will not be to him the dull routine of labor, for it gives more room for thought, and fuller opportunities for the exercise of an intelligent mind, than any other profession or occupation which engages the attention of educated minds.

The remarks before made are founded largely upon my own observations, but are largely supported by "The Alphabet of the Principles of Agriculture" and "Further Steps in Agriculture"—both very useful text-books.

Discussion was postponed until next meeting.

Attendance.—It was resolved to strictly enforce the rule *re* attendance in future.

### Mount Compass, October 13.

Present—Messrs. J. Youlton (Chairman), F. Slater, S. Chaplin, E. Good, A. J. Hancock, R. Peters, D. Wright, S. Athurs, W. Wright, H. McKinlay (Hon. Sec.), and two visitors.

ROOT CROPS FOR SEED.—Mr. Slater wished to know whether such plants as parsnips, carrots, beet, &c., degenerated through being allowed to seed without being transplanted. Members thought the best seed was obtained by transplanting the plants intended for seeding.

FRENCH HONEYSUCKLE.—Mr. Hancock tabled plant found growing vigorously in his garden. [This is French honeysuckle or *sulla* (*Hedysarum coronarium*), a valuable perennial fodder plant.—GEN. SEC.]

### Dowlingville, October 9.

Present—Messrs. R. A. Montgomery (Chairman), T. Illmann, W. T. Holland, F. Roberts, H. Crowell, W. Walker, and J. L. Broadbent (Hon. Sec.).

FIELD TRIAL.—Matters in connection with the N.Y.P.B.F.T. and Show Society were dealt with. Members were in favor of depositing £25 credit balance from last trial in Savings Bank. Do not favor Executive having power to make levy on Branch; and are in favor of giving medals as prizes.

TOMATOES.—Mr. Crowell wished to know how to destroy "grubs" in tomatoes. [Grubs are the immature forms of various beetles; they seldom attack tomatoes or other fruits. More probably the pests are caterpillars, which change into moths or maggots which become flies. It is difficult to advise what to do in such a case, except to examine the fruits frequently and destroy such that are affected. If only the foliage is attacked, sprinkle the plants with a



mixture of one-half each of pure Paris green and slacked lime, or chalk or flour.—**GEN. SEC.**] Members think the pear tomato thrives best in the district, but is not much liked. Plants should be well watered till the fruit forms, then give less, and mulch if possible. [Use rainwater wherever obtainable for tomatoes.—**GEN. SEC.**]

### **Inkerman, October 12.**

Present—Messrs. S. Diprose, E. M. Hewett, D. J. Strongman, D. Fraser, W. Board, C. H. Daniel, W. Fraser, and W. A. Hewett.

**OFFICERS AND RULES.**—Messrs. S. Diprose and W. A. Hewett were elected Chairman and Hon. Sec. respectively. Rules were adopted for the working of the Branch, and it was decided to meet monthly.

**CHANGE OF SEED.**—Mr. Diprose advocated obtaining seed of early wheat grown on strong heavy soil for sowing on their light soils. Other members thought they would get better results from seed grown on poorer soils than their own.

**ANALYSIS OF SOIL.**—Mr. Fraser wished to know whether the members could get soil analysed, and expert advice as to the kind of manure suitable for such soils. [Soil is analysed at the School of Mines, Adelaide, at a charge of 3s. for each determination required. The same money expended on practical tests with different manures on a small scale would give far better return for the expenditure. The analysis will show what the soil contains, but not whether such constituents are immediately available as plant food. Professor Lowrie, at the Ninth Annual Congress, in referring to this point, said:—"There are few eminent agriculturists living who would put stress upon the analysis of a soil as a means of ascertaining what is the capacity of that soil, or what manure it requires. You put an analysis of soil before me, and I would not dare tell you what that soil would grow, even though it was a good analysis. I would want to see the class of country, know the rainfall, and what weeds or timber were growing on it."—**GEN. SEC.**]

### **Bute, October 18.**

Present—Messrs. A. Schroeter (Chairman), H. Schroeter, W. Langford, W. H. Sharman, E. Ebsary, J. J. Chapman, and D. Green (Hon. Sec.).

**FIELD TRIALS.**—Matters in connection with the forthcoming field trial of agricultural implements near Kadina were dealt with.

**MANURING.**—The Hon. Sec. reported that the drilled and manured crops were looking very well. By putting in the crops with from 75lbs. to 100lbs. of phosphates the sandhills in the districts which used to be considered worthless for wheat, will produce nearly as good crops as the flats in an average season, and better in a dry one, as the sand retains the moisture so much better.

### **Mundoora, October 8.**

Present—Messrs. J. Blake (Chairman), W. Atkinson, R. Harris, W. J. Shearer, N. J. Francis, W. Longmire, G. Haines, and A. E. Gardiner (Hon. Sec.).

**DAIRYING.**—Members were unanimously agreed that more attention should be given to this industry in the district, and that efforts should be made to improve the stock.

**WILD OATS.**—In reply to question, members were generally of opinion that the best time to cut wild oats for hay was just after coming into ear, and

while still very green. If left to dry before cutting stock did not care for it. Members stated they noticed two kinds of wild oats—one being pale-green in the straw, and the other having a resemblance to purple straw. The latter does not appear to be liked by stock either as hay or in the paddocks.

### Port Broughton, October 11.

Present—Messrs. R. W. Bawden (Chairman), W. Bennier, R. Storr, H. H. Whittle, J. Harford, J. Barclay, W. R. Whittaker, W. Tonkin, George Pattin-gale, and S. M. Bawden (Hon. Sec.).

**SMALL PADDOCKS.**—A discussion took place in reply to an inquiry as to whether it paid to divide the farm into small paddocks. Members were of opinion that it did pay to divide the farm into paddocks of from fifty to one hundred acres, provided you can supply water in each. The advantages of small paddocks are many. The sheep and horses do better, the feed is not trampled down and wasted as in large paddocks, stock can be shifted oftener, and the feed given a better chance to grow. At harvest it is also an advantage, as after the one paddock is reaped the horses can be turned in here at night in the stubbles and save stabling.

**STRAYING CATTLE.**—A discussion ensued on the question of damage done by horses and cattle being allowed to stray on the public roads. Members were of opinion that the farmers had the remedy in their hands, as if stock annoyed them in this way they could impound them. As all the damage to fencing is caused by such stock pushing through to eat off the crop close to the fence members thought it would be a good plan to plough up three or four furrows round the paddock.

**CABBAGE CATERPILLAR.**—The Chairman reported that his cabbage plants were being riddled by the caterpillars of a small white moth. [Spray the plants on the first appearance of the caterpillar with 2ozs. of alum dissolved in a gallon of water, or pour 4ozs. gas tar very slowly into 1½galls. boiling water; stir all the time until dissolved; then add 35galls. of water and spray it upon the plants.—GEN. SEC.]

### Mount Remarkable, October 6.

Present—Messrs. A. Mitchell (Chairman), S. Challenger, A. Pope, W. Girdham, G. Yates, W. Lange, C. E. Jorgensen, T. P. Yates, T. H. Casley (Hon. Sec.), Professor Perkins, and a few visitors.

**FRUIT-GROWING.**—Professor Perkins was driven round the district and inspected a number of farms and orchards, and in the evening gave an interesting lecture on fruit growing.

### Johnsburg, October 4.

Present—Messrs. F. W. Hombach (Chairman), P. Caughlan, L. Chalmers, T. Thomas, T. A. Thomas, J. Sparks, W. McRitchie, H. Napper, G. H. Dunn, W. James, T. Johnson (Hon. Sec.), and two visitors.

**CODLIN MOTH.**—The Chairman mentioned that he had been told that the codlin moth existed in a garden in one of the adjacent districts. Members did not know whether this was so, but they had purchased apples in the district which contained the caterpillars.

### Penola, October 18.

Present—Messrs. D. McKay (Chairman), J. W. Sandiford, Dr. F. Ockley, W. R. Pounsett, W. Miller, D. Balnaves, J. Fowler, and T. H. Artaud (Hon. Sec.).

**RYE FOR HAY.**—Millicent Branch wrote that the best time to cut rye for hay was directly it had finished flowering, but that rye was not much favored except for winter green feed.

**RAINFALL.**—Recorded at Penola for September, 3·045in.; at Coonawarra Fruit Colony, 2·590in.

**AGRICULTURAL SCHOOLS.**—Mr. Fowler called attention to the fact that there seemed some difficulty in obtaining a suitable piece of land in the South-East, and he thought they should again urge the claims of Penola, as suitable land could easily be obtained here. The Hon. Sec. was instructed to bring the matter before the Minister of Agriculture.

**SOUTH-EASTERN CONFERENCE.**—The question of place for holding the Annual Conference of South-Eastern Branches was considered. It was decided to ask the Tatiara Branch whether they would arrange for it at Bordertown, and, failing this, to suggest that it be held at Lucindale.

**DAIRYING.**—It was decided to ask the local council to obtain a pure-bred bull to run on the reserve, and to recommend the Ayrshire for preference. Dr. Ockley said he had been trying some experiments with copra cake. He found it increased the richness of the cream to a considerable extent; the cost came to about 1d. per cow per day, and he believed that the increase in the supply of butter was worth quite 6d. per day. It was also capital food for fowls.

### Cherry Gardens, October 12.

Present—Messrs. J. Potter (Chairman), T. Jacobs, C. Lewis, J. Lewis, J. Mackereth, J. Richards, G. Brumby, G. Hicks, R. Gibbins, E. Wright, and C. Ricks (Hon. Sec.).

**SEED EXPERIMENTS.**—Mr. Mackereth reported very favorably of Surehead cabbage received from the Bureau. It was a splendid variety, and he intended to save all the seed he could. Mr. Richards had an unfavorable report to make of another variety.

**CATTLE DISEASE.**—Mr. Jacobs reported having made a *post mortem* examination of a cow which died very suddenly, though in good condition. It was milked in the evening, and was found dead next morning. He found her to be suffering from hydatids, and asked whether people who had used the milk would be likely to suffer from its effects. [Mr. C. J. Valentine says the milk would not be in any way injurious, though naturally it would be of poor quality.—GEN. SEC.]

### Arden Vale, October 11.

Present—Messrs. A. Hannemann (Chairman), M. Searle, D. Liebich, J. Francis, P. Starr, E. H. Warren (Hon. Sec.), and several visitors.

**CO-OPERATION.**—In discussing the paper on "Our Prospects," read by the Hon. Sec. at a previous meeting, Mr. Fricker dwelt particularly on the necessity for more union amongst farmers, and quoted from the October issue of the *Journal of Agriculture and Industry* figures showing the progress of the S.A. Farmers' Co-operative Union and the Adelaide Co-operative Society. Numerous instances were given where combination would result in a saving of expense, and it was unanimously agreed that every farmer should help in extending the Farmers' Union, with a view to becoming more largely distributors of their own products and buyers of supplies direct from the manufacturers.

**WHEAT FOR SEED.**—Mr. Searle said he had tried experiments with wheat reaped in the dough stage, and found it germinated splendidly. He considered the market value of the wheat quite equal to that reaped by the stripper. If proper care is taken when reaping with the stripper to reduce the speed by enlarging the pulley, which he did by placing a piece of leather round it, he found that the amount of cracked grain was reduced to a minimum. He also found that of wheat planted 2in. deep 100 per cent. germinated; 4in. deep 70 per cent., and 6in. deep only 30 per cent. germinated. In each case the soil was thoroughly wet. He believed part of the success of the seed-drill was due to the uniform and shallow sowing. The necessity for a regular seed-bed is apparent. Other members agreed, and some stated they made it a practice to harrow once before sowing.

**EARLY WHEATS.**—After considerable discussion, and taking into consideration the risk of damage by frost when the plant is coming into ear, members decided that, taking the average of seasons in this district, at least three-fourths of the crop should consist of early varieties of wheat, and if the seeding is necessarily late nothing but early varieties should be sown. The outlook at present indicates a return of 1bush. to 2 bush. per acre from the early wheats, and nothing from the late.

### Gawler River, October 14.

Present—Messrs. A. M. Dawkins (Chairman), J. Hillier, A. Bray, F. Roediger, J. Badman, H. Heaslip, R. Badcock, E. Dawkins, J. S. McLean, H. Roediger (Hon. Sec.), and five visitors.

**BINDER AND HEADER V. STRIPPER.**—Mr. R. Marshall, of Hope Farm, Templers, read a paper on this subject:—

In this paper I only propose to give you the results of my own experience and observation, as between the relative results of harvesting a wheat crop by the two methods, viz.: binder and header *versus* stripper. My first experience of the former was in 1891, when I harvested most of my crop by this method, using Hornsby's binders and a Bagshaw header, beginning the cutting when the wheat was in the dough stage, or say from eight to twelve days before the crop would be properly fit to strip. Should the crop ripen unevenly, it is better to begin the cutting on the green side, and pass on to the stack without thrashing any sheaves that would be liable to damage the sample of grain. In this way the straw is considerably enhanced in value for fodder, and will more than make up the loss of grain.

Experience teaches that the stooking should be kept up as close to the binders as possible, and the stooks made as large as practicable. Instead of standing the sheaves it is much better to lay them down, first as bottom row, butts towards the west, reversing the other sheaves, taking care in building to break the joints by placing the sheaves of each successive row just where the two sheaves meet underneath. The stook when finished, if built in this way, will have a gentle slope towards the west, from which direction the roughest winds and most rain is generally expected. If well built, the stooks will generally withstand wind and rain without much damage, is quicker and much easier put together, and handles much better from the pitching in the field until it reaches the stack. In addition to the foregoing advantages, the straw retains color and the grain matures better, caused no doubt on account of the sheaves lying closer, excluding, to a very great extent, the effects of wind and sun. I would emphasise as much as possible that every care should be exercised to secure good stooks close behind the binder. The quality of fodder and grain depends as much on this as upon the cutting at the proper time. After cutting a considerable quantity, and not having had any previous experience of harvesting a grain crop by this method, I determined for future guidance to test the results by both methods, choosing a piece of Leck's wheat of about 66 acres. The land on which it grew was all fallowed, and treated in every respect the same. The crop was a very even one; no perceptible difference was noticeable. After cutting around the outcides of this piece with the binders, of what we consider about half, the rest was taken off with strippers. After winnowing from the strippers the produce of 34 acres I had 546½ bush. of good wheat, or 16 bush. per acre; 31 acres 3 quarters 27 perches, bound and headed, yielded 485½ bush., or 15½ bush. per acre—the results in wheat showing in favor of stripping by about ½ bush. per acre. Having shown the results in wheat up to this point, I will now endeavor to show the actual financial results, charging such prices as I considered

reasonable at the time for the work, at per acre. I am giving the price that the straw realised at the stack. The wheat I am giving at 4s. per bushel, which was about the ruling rates at the time. As the wheat all went for seed, I realised a higher price than quoted. I am therefore taking market values:—

## BINDING AND HEADING.

Dr.	£	s.	d.		Cr.	£	s.	d.
To binding and stooking, at 7s.					By one ton straw, at 60s. ....	3	0	0
per acre .....	0	7	0		" Wheat—15½ bush., at 4s. ..	3	0	10
" Carting, thrashing, and stack-					Total .....	£6	0	10
ing straw at 9s. ....	0	9	0		Deduct cost .....	0	16	0
Total .....	£0	16	0		Balance .....	£5	4	10

## STRIPPING.

Dr.	£	s.	d.		Cr.	£	s.	d.
To stripping, at 3s. 6d. per acre	0	3	6		By wheat—16 bush., at 4s. ....	3	4	0
Total .....	£0	3	6		Deduct cost of stripping .....	0	3	6
					Total .....	£3	0	6

Thus showing £2 4s. 2d. per acre in favor of the binder and header. Whether it will pay best to strip, or bind and thrash with the header, I think depends entirely upon circumstances. If hay is scarce and high in price headed straw then comes in demand, and will generally realise within about 5s. per ton of hay, providing it is of good color and quality. On the other hand, when hay is plentiful and cheap very little demand exists for headed straw, and it is, practically speaking, unsaleable at a remunerative price. However, to be provided with fodder in seasons of scarcity it is necessary to make a provision in seasons of plenty. Had this plan of provision been generally adopted no doubt much valuable stock could be saved from starvation this season. That horses can do a fair day's work and keep in fair condition on headed straw chaffed, fed to them three times a day, mixed with a little bran, pollard, or crushed corn, with long hay at night, I have proved to my own satisfaction. At the same time I cannot agree with those who say it is equal to good hay. I have also read and heard various opinions expressed respecting the relative value of the grain for seed, some thinking 1 bush. from the header equal to 1½ bush. from the stripper, giving as a reason that less grain is cracked from the header. I find very little difference in cracked grain between my damp-weather strippers and the header. What I am more anxious to find out is whether there is a difference, for better or for worse, between the wheat cut before ripe, or that left until properly matured, before stripping. I have on different occasions sown the two side by side without being able to detect any difference in the crops. Only recently I saw a crop growing at Mr. James McDonald's, Woodend, near Roseworthy, who informed me the seed was thrashed from a load of hay. I could detect no difference from that growing alongside from good seed. I would like to mention here that Professor Lowrie does not regard the immature seed favorably. He can, no doubt, speak with greater authority than myself. I have only made the one comparative test—that referred to in 1891. I have taken this as my guide in all my operations since. Lighter and uneven crops will give results more in favor of the stripper. Bearing this in mind, one has to be guided by the price of grain and fodder in deciding which system will pay best. Speaking in a general way, it will not often pay to harvest a light crop with binder and header.

In answer to questions he stated that he stooked the sheaves by laying them down on the ground with the butt ends of the bottom row of sheaves facing west; if properly laid they are not much injured by rain. He thrashed them with a Bagshaw header and did not find it cracked the grain to any extent. He did not consider the straw left after stripping of much value, but thought headed straw almost equal to good hay and superior to much of the inferior hay used. He did not find it scour the horses. The loss of grain through extra handling was not much; the grain was quite equal for flour to stripped wheat, and weighs as well. With eight men and a boy he brought from the field 25 tons daily, put it through the header, and stacked it. The cost of binding, stooking, and heading came to about 16s. per acre, varying according to the crop.

**OATS FOR HAY.**—In answer to question Mr. Marshall said in his opinion Dun oats were the best for hay; they should be cut soon after blooming.

**APHIS.**—Mr. Bray said he successfully treated peach aphid by spraying the trees with 1lb. tobacco waste boiled in 4galls. of water. The Chairman had used 2lbs. kerosene soap dissolved in 4galls. of water for orange aphid with good results.

### Orroroo, October 16.

Present—Messrs. E. Copley (Chairman), J. Moody, J. Jamieson, W. S. Lillecrapp, M. Oppermann, A. Zanker, E. Kirkland, R. Coulter, sen., and T. H. P. Tapscott (Hon. Sec.).

**PRESERVING FRUIT.**—Mr. Tapscott tabled preserved damsons, two years old, and of excellent quality. He preserved them in bottles in the following manner:—Select good, sound, ripe fruit; place a layer of white sugar in bottom of jar; then a layer of fruit and another layer of sugar, and so on until jar is filled; then fasten down as air-tight as possible. This will be found a simple and cheap way of preserving surplus fruit. [One and a quarter pounds of sugar to 1lb. of fruit is the rule for preserving soft fruits without boiling.—GEN. SEC.]

### Port Germein, October 16.

Present—Messrs. G. Stone (Chairman), J. K. Deer, T. S. Marshall, W. Mortess, A. Thomson, and H. J. Gluyas (Hon. Sec.).

**LABOR-SAVING MACHINERY.**—The Hon. Secretary read an interesting paper on labor-saving machinery as applied to agriculture, showing at length the many great improvements made during the last fifty years. Australian inventors had been in the front in this matter, and the result of their work had been to enable us to produce more cheaply, and thus compete with other countries. The twine-binder was one of the greatest inventions of the age; the stripper and steam-thrasher were also wonderful labor-saving inventions. The lessening of manual labor on the farm rendered farm life more pleasant and attractive. Mr. Deer pointed out where, in his opinion, the present implements could be greatly improved to suit local conditions. The Chairman dwelt specially on the value of the disc-header as a means of saving the straw for seasons of scarcity, and separating of the grain cheaply from the chaff.

### Clare, October 8.

Present—Messrs. J. Christison, W. Kelly, H. Miller, H. Carter, R. Yeates, J. Treleaven, W. Birks, R. E. H. Hope, W. Kimber (Hon. Sec.), and one visitor.

**FENCING WIRE.**—Mr. Lewcock wrote that he had tested Waite's special wire for trellis work, and found it very suitable. Mr. Birks also spoke well of this wire. He used No. 8, and had no breakages, nor did it stretch like ordinary wire. Mr. Hague said he had been using a lot of this wire, and could highly recommend it for its non-stretching qualities. He found it advisable to use a piece of ordinary wire when tying round the strainers, as Waite's wire was apt to break at the turn. The Hon. Secretary said that he had made inquiries in various directions with satisfactory replies, and had decided to use this wire for trellis work, for which the ordinary wire was not quite good enough.

**APPLES.**—The Chairman tabled a few specimens of Rokewood apples, and some of the same variety cooked. The apples were firm and as solid as when pickled and of fair eating quality. The cooked apples were of very good flavor.

**FODDER PLANT.**—Mr. Kelly tabled sample of Giant clover, grown by Mr. J. Pascoe, of White Hut. It was sown twelve months since in ordinary soil, and had made splendid growth. Members were very favorably impressed with the qualities of this plant for fodder purposes.

**Maitland, October 2.**

Present—Messrs. C. F. G. Heinrich (Chairman), A. Jarrett, J. Kelly, O. Treasure, J. Pitcher, J. W. Shannon, H. R. Wundersitz, J. S. McLeod, C. W. Wood (Hon. Sec.), and two visitors.

**VINE DISEASE.**—Mr. Wundersitz tabled sample of diseased vines. He stated that fruit and leaves dry up and fall, and the ends of shoots die back. Other members reported their vines to be similarly affected.

**CONSERVATION OF FODDER.**—Mr. Kelly read a short paper on this subject, in which he strongly advocated the binder and disc-header for harvesting portion at least of the crop. Not only would they get a supply of useful food, but by cutting the crop before quite ripe they could secure it earlier, and save much loss of grain from storms and rain. With careful handling of the sheaves the loss of grain is exceedingly small, especially if carted from the field direct to the header, and thrashed before stacking. The earlier it can be removed from the field the better the color and nutritive value of the straw. As most farmers have horseworks, &c., the additional expense for the header will be from £12 to £16, according to make. One with an elevator, to save too much handling of the sheaves, will be best.

**Mylor, October 9.**

Present—Messrs. W. H. Hughes (Chairman), John Roebuck, E. T. Oinn, W. B. Lund, S. Roebuck, W. T. Elliott, R. S. Mundy, T. Mundy, A. Hampton, W. Nicholls, S. Pearce, P. Probert, F. Rosser, W. G. Clough (Hon. Sec.), and two visitors.

**SEED EXPERIMENTS.**—Mr. Probert tabled sample of canary grass, 3ft. high, which he stated yielded heavily. Mr. E. T. Oinn showed good sample of sugar-beet weighing 10lbs. Seed of pumpkins, melons, earth almonds, and *Canna edulis* were tabled for re-distribution. Other formal business was transacted.

**RAINFALL.**—For September, 2·840in.

**Eudunda, October 11.**

Present—Messrs. F. W. Paech (in chair), H. D. Weil, J. G. Pfitzner, H. Hage, J. W. Kriebel, E. T. Kunoth, C. Wainwright, G. A. Hilbig, and W. H. Marshall (Hon. Sec.).

**MANURING.**—A discussion took place on the prospects of the wheat crops in this district which have been drilled in with manure. Members who had inspected these crops were unanimous that they showed to great advantage compared with the broadcasted crops.

**Gladstone, October 1.**

Present—Messrs. J. Tonkin (Chairman), J. H. Rundle, T. Hortin, E. Matthiessen, J. King, J. A. Gallasch, C. Gallasch, E. Coc, and seven visitors.

**MANURING.**—This meeting was held at the residence of Mr. J. King, at Gulnare, for the purpose of inspecting the farm and crops. Mr. King has 700 acres under crop, all of which has been drilled in, several different kinds of manures being used, and some being put in without manure. The first crop inspected was some barley drilled in without manure. This was sown with about  $1\frac{1}{2}$  bush. per acre, and some of the members considered it too thick; it was sown in June on land not fallowed and was very strong. Next was a crop manured with 1cwt. superphosphate per acre; this was very much superior to

the former. Another part was manured with 1cwt. Thomas phosphate; this was not so high as the other, but quite as healthy, and, though not so forward, was considered by several as likely to yield as well if not better than the others. Strips had been left here and there through the field without manure, and the contrast was very marked. Another piece top-dressed with an expensive manure showed no improvement. On the whole the crops were very clean though sown in June, and promise to give a handsome return for the expenditure. King's wheat, a solid straw variety, came in for some attention. It is very forward and promises a good return. Several miles were traversed inspecting the crops, and some noticed belonging to other owners were very good, one of which promises a yield of 4 tons of hay per acre. Generally, however, the weeds are too prevalent for a good yield of wheat. After inspecting various implements members were entertained by Mr. and Mrs. King.

### Boothby, September 21.

Present—Messrs. J. T. Whyte (Chairman), A. Turnbull, H. S. Robinson, T. R. Robinson, R. M. B. Whyte, T. Sims, J. Bell, R. Chaplin, G. T. Way (Hon. Sec.), and three visitors.

**COLOR OF STOCK.**—Mr. Wheeler wrote that he would like members' opinions on the question of color of stock. The Chairman did not consider color was of any importance; it was simply a matter of taste. If you breed from good stock you will get good animals whatever color they may be. Mr. Turnbull agreed, but at the same time favored a dark horse. Other members supported, and Mr. Sims said he had seen and owned supposed soft colored horses and cattle and found the quality was quite independent of color. It was agreed that where the breeds were kept pure color was a matter of importance to the breeder at least, but in mixed breeds it was of no account.

**VERMIN DESTRUCTION.**—Some discussion took place on this subject. Mr. Robinson was of opinion that it would pay farmers to proof-fence any small pieces of land on which vermin were most troublesome, as they could lay poison at any time in the enclosures without danger to their stock.

### Boothby, October 12.

Present—Messrs. J. T. Whyte (Chairman), R. M. B. Whyte, G. Wheeler, T. Sims, J. A. Foulds, J. Bell, W. Mills, E. Bradley, J. Sellhorn, M. Leonard, H. S. Robinson, G. T. Way (Hon. Sec.), members' wives, and seventeen other visitors.

**VISIT TO HOMESTEAD.**—This meeting was held at the residence of Mr. G. Wheeler, and after the business of the meeting was concluded a very enjoyable evening was spent by the visitors.

**WHEAT-GROWING.**—Mr. Foulds, in an interesting address on the value of lime, strongly advocated its use on wheat lands. He also pointed out the benefit of putting the seed in with manure by means of the drill. Mr. Mills said last year he manured a plot of onions with Thomas phosphate, but, the season being very dry, did not see any benefit. This year he planted wheat and cabbages on this plot, and the influence of last season's manuring was most marked, the crop being far stronger than those adjoining. Mr. Wheeler said the advantages of thorough cultivation at seeding time was easily seen in the condition of the crops. Messrs. Sims and Robinson reported that on the small plots where Thomas phosphate was drilled in last season the crops this year showed much more growth than those alongside, though sown some weeks later. Members generally were of opinion that rolling the crops when 3in. or 4in. high was beneficial.



**Lucindale, October 10.**

Present—Messrs. E. Feuerheerdt (Chairman), S. Tavender, B. Feuerheerdt, H. Langberg, A. Matheson, W. Dow, G. Newman, L. McInnes, A. Dow, J. Nilan, O. A. Witt (Hon. Sec.), and some visitors.

RAINFALL.—Recorded for September, 3·040in.

SEED EXPERIMENTS.—Several members reported seeds generally failed to germinate. Mr. A. Dow said his "Insect Powder Plants" were doing well and blooming. He wished to know how the plant was utilised. [The flower heads alone are gathered, dried until brittle, and ground to a powder.—GEN. SEC.]

INSECT PESTS.—Mr. Newman had tried both sulphate of iron and sulphate of copper, also wood ashes thrown on the trees and put round the stem, and got rid of the aphid on his trees. Several members reported prevalence of peach aphid on apricot trees, and Mr. Lobban, a visitor, stated he had got rid of this pest by painting the roots and places where they were congregating with coal tar thinned with kerosene.

MANURES.—Mr. Langberg reported having tried Thomas phosphate, caves guano, bonedust, kainit, &c., on his crops. The first-named promised best results; it was drilled in at rate of 10lbs. to 15lbs. [Query—40lbs. to 45lbs.—GEN. SEC.] to the acre with the same weight of wheat, with a drill of his own construction. Mr. Tavender also reported very favorable results with this manure. Mr. Feuerheerdt said he had very satisfactory results from a dressing of 5cwts. of Kangaroo Island guano per acre. Mr. Stewart had told him that he had got splendid results from soaking this guano in water and mixing the seed with it before sowing.

WEEDS.—Mr. Findlater forwarded specimen of plant growing very luxuriantly on the Avenue Flats which had been identified by the Gen. Sec. as *Acanthus spinosus*, a garden escapee. A specimen of *Bartsia latifolia*, another useless weed, was also tabled.

**Woolundunga, October 9.**

Present—Messrs. T. H. Prosser (Chairman), J. G. Moseley, H. Aldenhoven, W. McLaren, W. White, J. H. Michael, J. Grunike, F. A. Sells, J. Dunn, and N. Rogers (Hon. Sec.).

VISIT TO HOMESTEAD.—This meeting was held at the farm of Mrs. Hughes, several of the members' wives being present. After the business was concluded the visitors were entertained at tea.

EXHIBITS.—Mr. Moseley tabled samples of skinless barley, 4ft. in height, being the second cut this season. The Hon. Sec. tabled good samples of table and Sultana raisins, and Mr. Aldenhoven samples of Mellor's new ploughshares.

PRUNING.—Mr. Rogers read paper from the *Mildura Cultivator* on pruning orange trees.

**Tatiara, October 14.**

Present—Dr. Murray Gibbes (Chairman), Messrs. G. Milne, G. Ferguson, J. Rankine, E. Prescott, W. Montague, H. Killmier, R. Scown, Thos. Stanton, W. E. Fisher (Hon. Sec.), and seven visitors.

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that during the past year eleven meetings were held, with an average attendance of six members. Two papers were read by the Chairman, but the other members were very remiss in this direction, and he strongly urged them to make an effort to prepare and read papers on practical agricultural subjects. A number of

practical matters have been discussed, the subject of manuring receiving special attention, both at the meetings and in a practical manner on the farms. Generally, the result of their work was satisfactory. Mr. G. Ferguson was elected Chairman and Mr. W. E. Fisher re-elected Hon. Sec. for the ensuing year.

**MANURING.**—This meeting was held at the residence of Messrs. Milne Bros., who are conducting very careful experiments with different fertilisers. In most cases the seed and manure have been put in with the drill, and the advantage of this method of sowing was very marked, the crops being very even, strong, and free from weeds, and much better than the broadcast crops on adjoining land. Rolling the manured crops proved more beneficial than harrowing. Members considered that the enterprising owners would be well repaid for their trouble and expense, and that from the appearance of the manured and drilled crops it was evident that the Tatiara land when properly manured would yield as good crops as any district in the colony.

### Mount Bryan East, October 9.

Present—Messrs. James Prior (Chairman), T. Wilks, T. Best, W. Brice, and W. H. Quinn (Hon. Sec.).

**FALLOWING.**—Considerable discussion took place on fallowing. Some members considered 5in. a suitable depth to plough, while others were of opinion that in very dirty land shallow fallowing is best, as the weeds being near the surface will start with the first rains, and can then be destroyed by scarifying.

**WEED.**—Members wished to know best way to eradicate sheep-weed. [Weeds of all kinds can be exterminated by constant attention. Be sure to prevent them seeding; if deep rooted, cut them off below the crown; never plough under any plants having seeds on them, else plants will continue to appear every time the seeds are brought near to the surface. Mustard, oats, tobacco, and several others have been known to germinate after the seeds had been buried twenty to thirty years. Sheep-weed should be pulled by hand. If this cannot be done wait till the young plants appear next season, and plough them under before they flower.—GEN. SEC.]

### Appila-Yarrowie, September 10.

Present—Messrs. J. H. Bottrall (Chairman), J. Wilsdon, J. C. W. Keller, J. M. Grant, P. Lawson, A. Fox, C. W. H. Hirsch, J. W. F. Hill, W. C. Francis, J. O'Connell, N. Hannagan, C. G. F. Bauer (Hon. Sec.), W. Gill (Conservator of Forests), and several visitors.

**FORESTRY.**—Mr. Walter Gill gave an interesting address on this subject, of which the following is the substance:—

In considering this subject we may look at it from three standpoints—first, trees for timber, firewood, and shelter; second, ornamental trees; and third, trees that will provide fodder in times of scarcity. A very great mistake was made in the early days in clearing off all the timber from so many farms, destroying much useful shelter and fodder. When farmers were clearing the scrub they should have left a belt of timber, say one chain wide, around their holdings. This would have afforded protection to crops and stock from both hot and cold winds. To replace this loss we must plant trees on every opportunity, especially on any rough land unsuitable for ordinary cultivation. Gum trees do not make good shelter, as they grow up a good height without branching. They are simply timber trees, and of them the Sugar gum will be found most suitable. They should be planted from 20ft. to 30ft. apart. Of ornamental trees, for shelter the Pepper tree (*Schinus molle*) will probably be best for this district, being hardy and evergreen. Gums and peppers should not be planted within a chain of crops or buildings. Of fodder trees, with which South Australia is well supplied, perhaps the *Sheaok* (*Casuarina* sp.) may be placed first. These should be carefully pruned when required for feed, and not chopped down and destroyed, as was done by many farmers. If an undercut is made with a saw and then the limb chopped, a clean cut will be effected,

and the tree will grow again as strong as ever. Sandalwood is not so valuable as the Sheaoak, and is difficult to get to grow. If, however, a piece of land on which they have been growing is fenced off, and protected from sheep, rabbits, &c., young plants will soon make their appearance in numbers. We have very many useful fodder shrubs indigenous to South Australia, and it is only where these have been destroyed to make room for wheat that real starvation is experienced in seasons of drought. We should at all times do all we can to protect any natural timbers still existing, and plant fresh trees on any vacant places on the farm. On nearly every farm these will in a few years be valuable, not only for the shelter they provide, but also for timber for sheds, fences, &c., and for firewood.

Members agreed that if the natural timber had been properly protected in early days there would have been no necessity for planting timber trees, and that in view of the fact that good timber was getting scarcer every day the subject deserved most careful consideration.

### Pine Forest, October 12.

Present—Messrs. J. St. J. Mudge, (Chairman), W. H. Jettner, D. F. Kennedy, W. Wurfel, J. Flowers, A. Zilm, J. Muller, A. Mudge, W. Burgess, R. Barr, jun. (Hon. Sec.), and R. W. Bawden (of Port Broughton Branch).

FIELD TRIALS AND SHOW.—Matters in connection with the Bureau Field Trial Society were dealt with. It was resolved to recommend that the present system of awarding framed certificates to successful competitors be continued, and that medals should be awarded to the drivers of the prize teams. Members referred to the late successful Branch show at Port Broughton, and were of opinion that the industrial section in particular was a credit to the exhibitors and of great practical value to the district.

VISIT TO HOMESTEAD.—This meeting was held at the residence of Mr. D. F. Kennedy, and after the business was concluded members inspected the orchard and garden, which is kept in splendid condition, weeds being conspicuous by their absence. All the trees look well, but the peaches, though healthy, have very little fruit on them this year. Mr. Kennedy called attention to the fact that the tips of the branches for three to six buds back were dying off, and attributed it to too free use of the pruning knife. Apricots severely pruned were not injured in any way, and he thought the peach required different treatment. Some of the members pointed out that where the shoots had not been cut back at all they were dying off the same way, and thought the trees must have received a severe check from some cause, probably the absence of moisture. Special notice was taken of the certificates of merit and prizes awarded to Mr. Kennedy at different shows for by-products and utilised waste substances, showing that the family work the farm to some purpose. The pure-bred Jersey bull, Pride of the Glen, recently introduced into the district, was much admired, and the hope expressed that Mr. Kennedy's enterprise would be fully rewarded.

### Narridy, October 2.

Present—Messrs. A. Bairstow (Chairman), A. McDonald, W. J. Porter, D. Creedon, Jas. Nicholson, W. J. Martin, and J. Darley (Hon. Sec.).

FIELD TRIALS.—The proposed rules of the Amalgamated Bureau's Field Trial Society were discussed and delegates appointed.

MANURING.—Mr. Nicholson reported having drilled in a small plot of wheat with superphosphate. This part of the crop was fully a foot higher than the unmanured portion.

**WORKING FALLOWS.**—The Chairman asked whether it was injurious to work fallow land when dry. Mr. McDonald said the more the land was worked, except with sandy soils, the better. Members were of opinion that very beneficial results were obtained by getting as fine a seed-bed as possible, but did not favor working the fallow when the ground is dry.

### Bowhill, October 23.

**Present**—Messrs. W. G. F. Plummer (Chairman), A. Dohnt, J. Gregory, E. Weyland, J. Whitehead, W. Tyler, J. D. Cockshell, J. Waters, W. Scars, and two visitors.

**GRASSES.**—The Chairman reported that most of his grass seeds received from Central Bureau had germinated, and were doing well. Mr. Dohnt said his seed had been in the soil for two months, but had not come up.

**WHEAT.**—The Chairman said he noticed very great difference in growth of different kinds of wheat sown at same time, and under same conditions. In one case in particular Purple Straw and Steinwedel were sown at the same time; the latter is fully 18in. higher than the former, and still quite green and healthy, while the Purple Straw was dying off. He favored the Steinwedel variety for dry seasons in this district.

**FLAX.**—The Chairman tabled sample of flax (linseed) 3ft. high, grown on sandy soil without irrigating. It would give a good yield of seed, and he strongly advocated its growth for feeding purposes.

**HAYMAKING.**—The Chairman read a paper on "Haymaking and Stacking," as follows:—

As this subject is appropriate for this time of the year, I hope there will be much discussion. I have had practical experience in the different ways of making and stacking hay, and this has led me to think that the best time to cut it is just after it has blossomed. I have tried it in all stages, from the blossoming period till nearly ripe. If it is cut in the middle stage you do not get the full nutritive value. Anyone wishing to prove this should feed their stock with hay cut at the three periods. They will find that the hay cut at blossoming, or at the nearly ripe stage, will give the best results. My objection to cutting hay when it has formed the grain sufficient for it to ripen in the head is that when fed to horses it is too heating on account of the quantity of grain in it. It will not command a ready sale, owing to the bleached nature of the stem, although it is more weighty. Appearance goes a long way in the marketing of chaff.

A common mistake made by many farmers is cutting the thinnest and worst-looking portions of their crop. I learnt by experience the difference by cutting the best. The advantages are that you have not to go over nearly the same area; it is more quickly gathered, and better to cock. I have known crops to yield as much grain at 2ft. high as those of 4ft. It will be seen by this that it would not have paid to cut that which was 2ft., when a considerable amount more could be gathered off a less area by cutting the 4ft. Another mistake we are liable to make is cutting dirty patches for hay to use for our own purposes. Invariably you get more rubbish the next year, and nicely spread perhaps over the whole farm, whereas it may have only been in patches before. It is carried by the stock. Wild oats, sheepweed, drake, and other weeds are always sufficiently advanced to ripen before the crop it fit to be cut, even at its earliest stage; therefore it is of no use to try and get rid of the rubbish in this manner.

Always cut the cleanest parts of your crop, and eradicate the noxious growths either by the aid of the plough or cut them before they seed for silo purposes. After being cut, hay should never lie exposed to the sun too much, as it loses much of its value both in appearance and nutriment. I always find it better to have it raked up directly it is mown, and put in heaps straight away. Of course if there are any signs of overheating in the heaps, it must be left in the rows longer. It is always better to be in the rows than lying for any length of time left as mown. I have left it exposed to the sun for a whole day, and raked it up the next, and heaped it the following; and then I have tried it mowing, raking, and heaping the same day. When carting it into the stack a difference was easily perceptible both in color and weight. I prefer putting it in large heaps, because there is not so much waste by evaporation; it does not offer so much area for bleaching, and it is better for resisting rain. It does not do to leave it in the paddocks too long; the quicker it is in the stack the better the hay will be.

There is more art in stacking than one would imagine. It is always a pleasure to look at a well-built stack; it requires practice to build one. With all the stacks I have built I have

had very little spoilt by the rain. The method I adopt in building is to straighten out the hay that is intended for the sides, by standing with my legs apart and raking with a fork the hay towards me, forming a sort of a bundle. Although this is not as quick as putting it on as it comes from the wagon, it saves time after, as the stack does not require so much pulling or raking. After one gets used to the bundling, it does not take much more time. I usually start building at one end of the stack and work around it, forming a layer, after which I scatter more hay into the centre, always keeping it higher than the sides. When I get sufficient in the centre, so that it is sloping downwards over the sides, I start putting on another layer, and so on till I reach the eaves, when I generally form the centre of the stack steeper, so that the layers will have a good downward tendency in order to carry the rain off. I do not believe in making stacks too high, because there is extra labor and time in pitching the hay up. I prefer making the stacks longer than higher. A good way to finish the stack, if it is not going to stand any length of time, is to drive stakes all around the eaves, and cover over the stack with loose straw.

Mr. Gregory advocated cutting dirty crops early, and clean crops late, so as to get extra weight. He did not agree that the dirty crop should not be cut for hay; it would be wasted otherwise. The Chairman's way of stacking was good, but tedious. Mr. Dohnt thought the best time to cut was about three weeks after blossoming, while Mr. Weyland thought a week after would be better. Mr. Tyler thought it depended upon the use to be made of the hay; if to be chaffed, cut it so that the grain will ripen, but for long hay, cut when quite green.

**WORK FOR MONTH.**—Strippers and other implements should be repaired and made ready for the harvest. Where sheds have not been erected for storage of cocky chaff, this should be done in any spare time between haymaking and reaping.

## STATE CONCILIATION IN TRADE DISPUTES.

The first report by the Board of Trade of proceedings under "The Conciliation (Trades Disputes) Act, 1896," which has just been issued, deals with cases which arose during the period from the passing of the Act (August 7th, 1896) up to the end of June, 1897. During this period action by the Board of Trade has been taken or invited in thirty-five cases. In thirty-one of these disputes applications were received from one or both parties, viz., nine from employers, sixteen from workmen, and six from both sides. In addition, action has been taken by the Board of Trade in four cases without formal application from either party. In twenty-six of these thirty-five cases there was an actual cessation of work either at the time of action or during the course of the of the negotiations.

The following table distributes the thirty-five cases according to groups of trades, and summarises the modes in which the disputes in each group were dealt with, and the results obtained:—

Groups of Trades.	Total Disputes dealt with.	Applications refused.	Disputes settled under Conciliation Act.		Disputes settled between Parties during Negotiations.	Disputes in which settlement was not effected.	Cases pending.
			By Conciliation.	By Arbitration.			
Building and kindred trade	7	1	2	1	—	2	1
Engineering, metal, and shipbuilding .....	12	3	4	3	2	—	—
Mining and quarrying ....	4	—	1	1	1	1	—
Clothing .....	4	—	3	—	—	1	—
Textile .....	3	1	2	—	—	—	—
Printing .....	1	1	—	—	—	—	—
Transport .....	4	1	2	—	1	—	—
Totals .....	35	7	14	5	4	4	1

It will be seen that seven of the applications were refused, that nineteen disputes were settled under the Act, and that four of the disputes were settled between the parties during the negotiations, while in four cases the efforts of the department to promote a settlement were unsuccessful. One case is still pending.

*Disputes Settled under the Act.*—Of the nineteen disputes settled, twelve were arranged by negotiations with the parties by the Board of Trade as prescribed in section 2 of the Act. In the case of seven of these disputes, joint conferences were held, a Board of Trade representative being present in six of the cases. In the remaining five disputes the agreement was arrived at without a joint conference by negotiations by the Board of Trade officer with the parties separately. In two cases gentlemen unconnected with the Board of Trade acted, at their request, as chairmen of conferences. Conferences were also arranged by the Board of Trade, and held in the case of four disputes in which no settlement has at present been effected under the Act.

In two cases the Board has appointed conciliators under section 2 of the Act, viz., Sir Horatio Lloyd, County Court Judge for Chester and North Wales, who acted in the case of the Wynnstay Colliery Dispute, and Mr. W. E. Willink, in the case of a dispute affecting carpenters at Preston.

Five cases have been dealt with by arbitration. In four cases the arbitration was the result of joint application by the parties. Sir William Markby, K.C.J.E., was appointed to act in two cases, and Sir David Dale and Mr. Thomas Bell (formerly one of Her Majesty's Inspectors of Mines) in one case each. The remaining case arose out of an agreement effected under the Act by conciliation, Sir Courtenay Boyle being named as umpire in this agreement. Captain Wilson, Chief Board of Trade officer in the port of London, has been also nominated as an umpire for any cases that may arise out of one of the agreements effected under the Act.

The informal collection of information has in many cases preceded any steps for the actual settlement of disputes, though no occasions have yet arisen in which, in the judgment of the Board of Trade, a formal inquiry and report would have served to promote a settlement.

*Disputes Settled between the Parties during the Negotiations.*—In three of these cases the action of the Board of Trade did not go beyond the initial stage of communication with the parties. In the remaining case, invitations to a conference were accepted by both parties; but before the holding of the conference an amicable settlement was mutually arrived at.

*Disputes in which no Settlement could be Effected.*—In one of these cases, a demarcation dispute between bricklayers and plasterers at Newcastle, the dispute was afterwards settled by private mediation. In the three remaining cases—viz., the Penrhyn Quarry dispute, a dispute in the Norwich boot and shoe trade, and a strike of painters at Middlesbrough—the disputes have not yet been settled.

*Applications Refused.*—Seven applications for intervention have been declined, mainly on the general ground that no useful purpose would be served by any action on the part of the department. These applications have been received on behalf of strikers after their places had been filled, or on behalf of employers after most of their workmen had obtained work elsewhere. In these and similar cases the discretion of the department is freely exercised with regard to intervention.

Under section 1 of the Act, fifteen Conciliation Boards have been registered, viz., eight District Boards, six Trade Boards, and one General Board.—*London Labour Gazette*, August.

# Journal of Agriculture

AND

## Industry.

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### NOTES AND COMMENTS.

The weather during November was very dry, and occasionally exceptionally hot. Crops northward from Adelaide and westward have suffered severely, whilst those in the Far North and North-East will probably hardly average the seed sown to produce them. Large areas of light wheat crops have been cut for hay, and hay crops are generally very poor in the localities named. In the cooler portions of the colony, amongst the Hills and South-East, the conditions have been very favorable this year, and the comparatively small area under cereals and hay will return excellent results. Where phosphatic manures have been applied in all districts the beneficial influence is apparent, and plots or portions alongside that have been accidentally missed, or purposely left unmanured, exhibit the neglect most unmistakeably.

The Californian *Orchard and Farm* of September, 1897, says :—" It has been several years since the railroads of this country were so blocked with grain and other products that they had four times as much as they could handle. But so it is with several of them at present. Good times always follow evil ones, in the case of both nations and individuals. Let the individual always remember that. It will help him when he is deepest in the dumps."

When mixing Paris green for spraying purposes, only a little water should be added at first. If too much water is used the powder will float on top and form into balls. Mix in the same manner as with mustard—a little water at a time. It is essential to provide against uncombined or free arsenic in the mixture, therefore add some quicklime, which will form arsenite of lime, and will not dissolve in water and injure the plants. When spraying with Paris green do not stand in the spray, never spray on a burning hot day, nor when a strong wind is blowing, nor when the trees are in bloom, nor later than one month before the fruit is to be gathered. Hot weather and strong winds acting upon the newly-sprayed foliage will injure it. Soluble poisons will kill both plants and insects. Paris green, if pure, is insoluble; but the acids in the digestive organs of the insects dissolve the poisons, and thus they are killed.

In years gone past several fruitgrowers wishing to ship fruit to England in the cool chambers of the ocean steamers found that they should have made application for space long previously. In order to save disappointment, the agents of the Mail Steamers are inviting early application for space. Those growers who wish to ship through our Produce Export Department should at once state when they wish to commence shipment, and the number of cases they wish to send by each steamer.

Caterpillars of various sorts are covering the country in several parts of the colony, and are destroying crops of fruit and vegetables. All kinds of insects which eat or gnaw foliage or fruit can be destroyed with the insoluble forms of arsenite compounds—such as Paris green, London purple, arsenite of lime, etc. Crows, magpies, larks, plovers, wrens, and several other birds would keep us free from such pests if our “civilising” proclivities would allow those useful friends to live on the land.

Several amateur horticulturists, especially on the plains, have complained that the leaves, twigs, and top branches of their trees have withered and died this year. As a fact, the same complaints are made every year. The trouble can almost always be traced back to stoppage of the upward flow of sap. In a few instances boring beetles, or their grubs, or else caterpillars which burrow under the bark, bring about these effects. In other cases the trouble is due to stagnant water in the soil—generally a very fine sand mixed with clay, or a heavy clay—which simply prevents access of air, and thus the roots are literally drowned or asphyxiated. In very many cases the trouble is caused by digging “an honest spit deep,” amongst the roots, which are thus cut and injured so much that a sufficient amount of sap cannot be provided. Stirring and pulverising 3in. deep is necessary; anything which interferes with the roots is injurious.

Tasmania is at last about to test the question of ventilation *versus* refrigeration in transport of fruit to Great Britain. Altogether 17,000 cases of apples will be exported under the improved process, of which Tasmania will supply 10,000, and New South Wales, Victoria, and South Australia will supply the rest. The steamer will first load at Hobart at end of February, and will be at Port Adelaide about the second week of March. The cost of freight will be considerably reduced. The fruit will be stowed in the hold, and the carbon di-oxide generated by the still ripening fruit will be driven out, and replaced by pure fresh air. This experiment will be watched with great interest, because under it freight charges will be reduced to about one-half.

The “Lily Disease” (*Rhizopus necans*), which has wrought such destruction amongst the bulbs grown in Japan, was scarcely known two years since; but the large export trade in bulbs has almost stopped already. It is reported that, of 73,000 bulbs of *Lilium speciosum* sent to one London firm, only 250 were fit for sale. The disease is a fungus, beginning its mischief at the base of the bulb, spreads upwards, making the whole soft and discolored. It has been found that a short immersion of healthy bulbs in a solution of 1 per cent. of corrosive sublimate or of salicylic acid will destroy all adhering spores. This discovery was made by the scientific staff of Kew Gardens.



For a beast weighing about 1,000lbs., two feeds per day of about 25lbs. of maize silage would be ample; but this would be supplemented with a little hay, corn cake, &c., according to the special requirements—such as milk, work, meat, and so on. A cubic foot of chaffed maize silage averages 50lbs. weight. Quite seven months of the year are deficient in succulent food for cows; but one acre well manured and cultivated would yield more than sufficient to feed two cows during that time; with irrigation much more can be depended upon. The question is, will it pay to work hard to provide feed for cows, and will the produce from those cows pay for the hard work? For pigs, silage is an excellent forage to build them up; but they must not be fed upon it when being “topped up” for slaughter. Poultry thrive well upon chaffed silage, and horses do very well if it is supplemented with some good hay and a little corn.

Whenever it can be managed the natural grasses and herbage should be allowed to produce seed, in order that the pasturage may be renewed. Many of our best grasses are annuals, and disappear from the land if prevented in seeding. The sweet nutritious herbage is much sought after by live stock, whilst the useless weeds are left to produce seeds. The result is that the pastures become overrun with useless herbs, which smother the few valuable plants that may have escaped destruction or have been reproduced from seed. It would well repay the labor to reserve certain paddocks alternately for seed production, and even to collect seeds and sow broadcast where seeding has been prevented. Heavy harrows might be run over the paddocks before the seed is scattered in April, and afterwards bushed harrows would sweep the seed under and cover much of it.

How careful we should be to check the first appearance of every evil thing. A spark may fall upon tow, and may be trampled upon at once, and all damage be prevented; but one half minute of neglect will give the fire such a hold that nothing can control it. Some time recently a new pest became introduced—how, when, or by what means no one can tell; but if the plants had been subjected to fumigation upon arrival no one would have suffered. This new pest is known as the Cineraria fly (*Phytomyza nigricornis*), which deposits eggs upon the leaves of cinerarias, sow-thistles, chrysanthemums, and other plants. These produce maggots, which enter the leaves and tunnel between the upper and lower surfaces, eating away the interior, leaving only the skin and veins. So far, the only remedy appears to consist in destroying the affected leaves by fire. If pot plants are immersed in water for an hour or two the maggots will come away, but the chrysalides stay and are not injured.

Whilst Baron Sir F. von Mueller, K.C.M.G., &c., lived, nearly every botanist in the world recognised his wonderful ability and his untiring diligence in the pursuit of botanical science, and, now that he is dead, scientists of every class have determined to keep his memory green in a practical and serviceable way. It is proposed to raise a public and intercolonial national subscription—first, to secure a medallion or bust of the late Baron; and secondly, to endow a medal or prize to be (annually, if possible) awarded in recognition of botanical, pharmaceutical, or horticultural work in the various Australasian colonies. In Melbourne the following gentlemen have been appointed an executive com-

mittee:—Sir John Madden (chairman), Sir Frederick McCoy, Mr. W. A. Brahe (German consul), Mr. C. Pinschoff (consul for Austro-Hungary), Mr. R. L. J. Ellery, Professor Kernot, Messrs. A. C. Macdonald, C. Frost, J. Bosisto, A. W. Howitt, J. A. Panton, with Mr. C. R. Blackett as treasurer, and Mr. Wiesbaden and Professor Spencer as secretaries. There is quite a distinct movement being made by the trustees in the late Baron's estate to raise public subscriptions for the purpose of erecting a tombstone over his remains.

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## FORESTRY.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

The question as to how the growth of trees may best be promoted over any given area, with a view to the ultimate production of timber, may be answered in various ways, according to the circumstances which prevail in the district to be operated on.

The system of reforestation by natural regeneration, may often be followed with success in dealing with country covered with natural forest growth, after the best timber has been removed, provided that sufficient large trees have been left standing to supply enough seed to furnish a thick growth of young seedlings. Land, however, that has never carried any timber must be afforested, either by sowing seed of various trees over a given area, or more generally by planting out young trees previously reared in the nursery grounds. Under some circumstances it may be possible to adopt a sort of combination of both methods, but as a rule one or other of the two plans previously mentioned will probably be indicated as desirable by the surrounding conditions. As the success of all operations connected with timber production is very largely dependent upon the local circumstances of soil and climate, it is evident that it may at any time be necessary to modify any general system, to meet, if possible, the special conditions of any given locality; and further modification may also be necessary on account of financial conditions, both as to the amount of money that may be available for carrying out any given undertaking, and also as to the extent to which such expenditure can procure the requisite labor, while the question of what class of timber will sell best must evidently be a ruling factor at all times in determining any method to be pursued. As already indicated, then, the results of natural regeneration are largely influenced, in common with all other methods of timber culture, by local conditions of climate and soil; but they also vary with the natural configuration of the country, and are, moreover, materially affected by the occupation of the land by stock to a greater or lesser degree, according to whether the animals depastured are of one kind or another, and whether they are so excessively numerous as to heavily overstock it, or so few as to understock it.

One of the first essentials for the germination of a seed is something in the way of a seed-bed possessing suitable conditions as to warmth and moisture, and a fixed position, so that the delicate plant after germination may strike its roots into the surrounding soil. On the forest floor, in many instances, the place where the seed drops is, under normal conditions, which have not been disturbed by any external agency, amongst the mass of little twigs, dead leaves, pieces of bark, and decaying portions of various plants, gradually collecting during many years, and slowly but surely rotting down into the best possible plant food, when mixed with the light surface soil on which it all falls. Sometimes the vegetation covering the soil may be mainly grassy in character, and easily destroyed by traffic of any kind across its surface, and the herbage itself may be very acceptable to all kinds of animals, and therefore rapidly disappear through the combined agency of grazing and trampling by stock. Sometimes the

soil protection may be composed of stiff and wiry undershrubs, only slightly palatable to stock, and well able to stand the rough usage arising from the passing to and fro of the animals as they gradually feed through the forest, in consequence of the rigid habit of their growth. There are also cases in which the forest floor boasts of no soil covering whatever, because there is no soil overlaying the rock, which thus appears naked and devoid of any surface suitable to form a seed-bed. It is evident that these varying conditions of the surface on which the seed may fall must exert a powerful influence for or against a successful natural regeneration. The question whether the surface of the forest floor is a steep hillside, a deep valley, a gently undulating rise, or a level plain, is almost as important as what the vegetation growing thereon may be, and the kind of soil composing the surface is equally entitled to consideration in determining to what extent it may yield to external agencies in such a way as to destroy any chance of providing a proper seed-bed for the reception of the seed by which the worn-out forest is to be regenerated. As long as the surface, even if a steep hillside, is not cut up by the trampling of stock, and the vegetation thereon is not fed off by them, seed may continue to fall and spring up into promising young seedlings; but when once animals get access to any forest area, the work of laying bare the surface soil commences, and the greater number that graze and the longer they graze the sooner they destroy all the surface vegetation, and then away goes the soil, which being now unprotected speedily becomes cut up by their sharp hoofs, and whatever can be shifted by the waters which flow down the steep hillside, after rain, rapidly gets washed downwards. In this way the hillside ultimately gets denuded of all the elements composing a proper seed-bed, and thus the establishment of young seedlings becomes, in most cases, a matter of great difficulty wherever a steep gradient prevails. Now and then, perhaps, a patch of young trees manages to get a start amongst some sheltering rocks, between which plenty of forest *debris* has lodged and retains a fair amount of moisture, but, in most instances, in country of a mountainous character like the Flinders Range, a large portion of the soil ultimately gets washed down to the lower levels, and, as it carries much seed with it, the result is that generally the natural regeneration is best in the creeks, and scanty on the hillside where the fall is sudden.

Wherever forests are situated in comparatively level or in gently undulating country, the difficulty as to a suitable seed-bed is very much lessened, and a good growth of young trees may generally be developed with proper protection from feeding by stock. There is also a considerable difference in the amount of damage done in grazing, according to the species of tree that may spring up. Some gums, for example, are devoured by all ruminating animals with the utmost avidity, while others are only eaten under stress of keen hunger for want of more palatable herbage. The sugar-gum (*Eucalyptus corynocalyx*) no sooner springs up to any size than it is immediately devoured, and not only do sheep especially relish the tender seedlings, they also eat the leaves from any old trees they can reach, and will follow any axeman in the forest who may be felling old timber; and when once a tree is down will seldom leave it till all available foliage has been fed off. The redgum (*Eucalyptus rostrata*) on the other hand is not so frequently disturbed, being evidently little relished either by sheep or cattle, even in the seedling stage, hence in districts where these two trees grow together, as they often do in the forest country in the ranges between the Wilmington and Wirrahara, the natural regeneration by redgum saplings largely preponderates over that by sugar-gums.

With regard to the influence of climate, it may be stated that, in the northern parts of this colony, even where the rainfall may be at once considerable and reliable, its actual value is much lessened by the long duration of the

dry heat invariably experienced there, in opposition to which even a fall of from 20in. to sometimes 30in. during the year is not sufficient to cause such a vigorous and uniform growth of young timber as is required. In the timbered country about the Mount Lofty and adjacent ranges, however, as well as that further to the south-western parts of the colony, the rainfall reaching as it sometimes does to between 30in. and 40in. per annum, combined with the cooler climate, with far less of the intense heat known in the north, renders the general conditions prevailing far more favorable to a good natural regeneration, and hence some areas may be found in the districts now indicated, where a splendid growth of young timber has been steadily developed entirely through the self-sown seed. Stringybark gum (*Eucalyptus obliqua* and *E. capitellata*), manna-gum (*E. viminalis*), redgum (*E. rostrata*), and sometimes South Australian bluegum (*E. leucoxylon*), with others of minor importance, all experience the advantages derivable from the favorable conditions previously indicated, and thrive remarkably well. In some parts, however, the invariable risk of bush fires, so constantly originated by the periodical burning of the rough pasturage by stockholders, largely retards, even if it does not absolutely prevent any satisfactory reafforestation of the country, which could soon be effected by the favorable nature of other conditions.

The ferns (common bracken) which in many localities form the only soil-covering of the sandy land on which the trees stand, are very inflammable at certain times, and easily carried by a strong wind from the burning forest on to fresh tracks, while in addition to this the tough bark of the stringybark trees forms far too ready a medium for spreading the conflagration far and near, hence the fire, started at first merely to burn off old dry wiry feed in order to induce a new and more tasty as well as nourishing meal for the stock, frequently gets far beyond the control of those who originally started it, and carries with it almost utter ruin to the young growing saplings, as, even if not killed, they get a heavy check to their future development. A proper system of fire protection can, however, be at any time carried out wherever the necessary expenditure can be justified by the ultimate results to be attained. Such a system, though not insuring absolute immunity from fire, will certainly reduce all risk from that source to a minimum.

The question of inadequate drainage crops up in dealing with some low-lying lands, more particularly in the south-eastern district; but if proper drainage were provided on similar lines to those adopted in England and elsewhere, the difficulty would be overcome, and a successful growth of timber ultimately ensured. In this case, also, it is, as with the question of fire protection, a matter of comparison of cost with final result. In reviewing the subject of reafforestation by natural regeneration or self-sown seedlings as a whole, after referring to most of its most important conditions in detail, it may be stated, speaking generally, that, all things considered, the average results attained in the northern parts of this colony under this system are not as satisfactory as could be desired, because the natural growth of the young timber is invariably too scattered and uneven to secure the maximum amount of marketable timber per acre. In other parts, however, where more equitable conditions prevail, the results attained would be far more satisfactory were greater attention given to secure immunity from injury to the young seedlings from stock and fires.

APPLE CROPS in America, England, and some parts of the Continent are reported to be short. England has only one-fourth of an average crop; South France has a light crop, but fairly good in the north; Belgium one-third of the average; Italy, good; Holland and Germany, fair; America, half the average, and very poor quality.

## POULTRY.

By D. F. LAURIE.

Separation of the sexes is perhaps the most important point in rearing table poultry, especially if size is required. As soon as there is the slightest disposition on the part of a cockerel to pay attention to the other sex he should be placed in the cockerel-run, in which on no account should any hen or pullet ever be allowed to go; if one does, look out for fighting. Game cockerels will live with perfect freedom from fighting if none of the other sex are visible. The smaller and more active breeds, such as Leghorns, Minorcas, and Andalusians, are very precocious, and require separating at about six weeks of age. Both cockerels and pullets grow into finer and better specimens if separated, and, most important of all, the cockerels retain all the qualities of a first-class table bird till they are well-grown, which is not the case if they are allowed to exercise their natural functions at an early age. Where there is extensive range, portable roosting-houses can be placed on different parts of the farm, and at such distances apart as to guard against the birds mixing. Where the space is limited recourse must be had to separate wired-in runs. Of course, where, as it often happens, two are in partnership and living some distance apart one might keep all the pullets, the other the cockerels. Young poultry of all sorts should always be graded and kept, not only according to size, but also as regards condition. If large strong birds and smaller and weaker ones are in the same enclosure the latter get trodden on, and as a rule injured, and are robbed of their fair share of food. Again, whoever wishes to succeed must know the condition of each individual bird. If, on overhauling a mob of growing young birds, several are found in poor condition and inferior in size they should be placed in a separate pen and receive extra attention. Too much attention cannot be given to this matter, as in breeding table birds, especially for export, uniformity in size, quality, and condition are three essentials to success, and consequent high prices. Some people allow their chickens to run at large with the hens, and in consequence find a difficulty in feeding. This may easily be overcome by using a number of cylinders, or circular enclosures of wire netting of different sized meshes; 6ft. in diameter is sufficient to accommodate a large number of small birds. These are light and easily carried about; the smallest chicks can go through 1½ in. mesh netting and feed in the enclosure without molestation. The next size may be 2½ in. mesh, and the larger size 3 in., or larger as required; in this way the chicks are, as it were, automatically graded. This plan is much used in other countries, and has been found convenient here. Many birds are deformed through being trampled on while young. In rearing poultry the chief aim is to bring them to maturity as soon as possible. In the case of stock birds to be used for breeding or exhibition at shows a little more attention and different treatment is required. This is a matter which will be dealt with another time. Keep your birds growing, feed them well on sound, wholesome food, giving such attention to cleanliness that disease never appears.

When the time comes to make a selection with a view to fattening for market the advantage of having made grading a cardinal point will be recognised. The most forward mob of birds is first to be overhauled, and those in best condition selected. Before any attempt at fattening is made each bird must be in good condition; it is of no use attempting to fatten a poor bird in a week or two. It is possible to put a certain amount of flesh on the breast, but the rest of a bird so fattened is generally all skin. The French are generally quoted as expert in the art of fattening poultry; it is the practice of French poulterers to exhibit dressed poultry for sale, with the back, not the

breast, on view. The reason is that if the back of a bird is in good condition the rest of the body will carry a due proportion of flesh. Therefore select your most forward birds, place in a yard by themselves, and feed well, using chiefly meal mixed with fat, and moistened with skim milk. Ground oats, barley meal, or bran and pollard will do. A week or ten days should get the birds in excellent condition, which may still further be increased by penning each bird separately and cramming, either by hand or machine. This, however, is a branch by itself, and hardly likely to obtain generally among breeders of poultry.

A sound and profitable trade can soon be founded if birds of the right description are bred and afterwards treated as here suggested. It is far more satisfactory, both to the producer and for the credit of the colony, to ship one dozen good specimens rather than a greater number of ill-assorted, scraggy old scrubbers. It costs less to rear a good bird than a bad one, and it must be remembered that the expenses of exportation are exactly the same, also that the values are widely different. I believe the Branches of the Agricultural Bureau could render a great help in initiating the export trade by making inquiries at what date producers in each neighborhood would be in a position to forward a given number of birds. In this way, if in each district a dozen breeders sent a dozen birds each and ten or twenty districts co-operated, a good shipment could be made; and, in addition, cost of rail and other items of transit would be lessened. Isolated shipments of odd crates will never found a trade. Co-operation is needed, or else private enterprise will at some future date engage in the business of collecting and exporting. This is done in England by men who are termed "higglers." The demand for eggs and high-class table poultry in England is growing rapidly. There is the market and we now can procure stock of the most approved description; every possible arrangement for killing, freezing, and final disposal is already perfected by the Government; all that is now required is that people shall make use of all these advantages. At a time when so many are complaining of the unprofitableness of general farming operations and scarcity of markets it might be as well to point to the fact that England spends over five millions sterling every year in eggs and poultry. The egg trade is another item worth considering: successful and profitable shipments have been made from the colonies. However, for this purpose selected eggs are necessary: no fertile eggs should be shipped, if possible. Where hens are kept for laying only they lay as well without cock birds as with, in fact rather better; the eggs will keep much longer and there will be less unsound ones on arrival. Here again it is essential to have some form of combination, as not only must the eggs be quite fresh when forwarded, but they must be properly graded and packed in conformity to the usages of the English market. The season is advancing and the time for shipment is drawing near, so no time should be lost in making arrangements. The value of eggs exported from South Australia for the month of October was £4,830. The return does not state destination.

Every week that a bird remains on a farm after it is fit for market is a loss to the owner. In addition to the extra keep there is the risk of death and disease. In our hot weather some management is necessary to ward off disease. As many people overcrowd to a considerable extent the birds have not enough breathing space, and the soil gets saturated with excrement, with the result that the hot sun, especially if aided by a shower of rain, soon brings disease, and consequent loss. I have never advocated poultry-farming on a large scale, but am of opinion that those who keep poultry may as well own birds that are productive as egg-producers, or of high-class table poultry. The egg-laying breeds are of no value for export; therefore breed as few cockerels of this description as possible, and, unless there is a sale for them for breeding, let

them be eaten, while young, at home. On the other hand, if only table birds are kept, if the quality is right as well as age and condition, they can always be disposed of satisfactorily. The general advice is to sell all old birds. From my present point of view this is a very reprehensible practice; such birds are useless for export. Consume them at home; if the toughest old patriarch can be rendered acceptable as follows:—After killing and preparing let the bird simmer gently till quite tender; on no account let it boil. Remove from the saucepan, drain for a time, prepare for roasting as usual, tie strips of ham or bacon round it, and bake for half an hour or so till browned; it is as tender as chicken.

## NOTES ON VEGETABLE-GROWING FOR DECEMBER.

BY GEORGE QUINN.

The sowings of runner and dwarf beans will be continued at intervals of about three weeks where it is desirable to maintain a constant output. The chief difficulty in growing dwarf beans on the dry open plains is in getting them up evenly. They are gross feeding plants, requiring plenty of manure and water. When the wily Chinaman sows beans he covers the seeds with finely-pulverised manure, which prevents the surface baking too hard to permit the tender stemlet carrying the first seed leaves from snapping in its course up to the light and air; but many of our European growers sow the beans in drills about 15in. or 18in. apart, and run a furrow channel between the rows. Into this channel the water is conducted. So far, so good; but in many cases the water channel is allowed to get too full, and it then flows over the beans, resulting shortly afterwards in a caking of the watered surface and ruinous damage to the germinating beans. If the ground be soaked well by means of a furrow, and then the beans sown in a drill made immediately on each side, the seeds being covered with dry earth—or, better, with pulverised manure—the plants will usually appear before a second watering is necessary. It is a point worth settling by experiment whether it would not be better to sow the beans in rows about 1ft. apart, with sufficient space between the pairs of rows to allow a Planet scarifier to pass down. Then after each soaking break up all the surface to a fine tilth. Of course this would necessitate opening fresh furrows at each watering, but when the enormous evaporation from a dried and cracked surface which has been flooded is considered the waste of moisture must be immense.

Later-ripening onions will be ready to harvest on the plains, and should be stored carefully in a well-ventilated cool shed. Small growers should string them and hang them up.

Potatoes will also be harvested on the plains, and very disappointing they are this season after the fine promise given in the spring.

Tomatoes and chillies or capsicums may be transplanted still, but if there is no ball of earth attached to the roots a shelter from the sun should be given. Earlier-planted tomatoes will be in fruit in early localities, and often fruits will ripen or color faster when gathered from the plants. The central shoots should still be tied to the stakes as they lengthen. If humid weather sets in and fungus diseases are found attacking the plants they should be sprayed with diluted Bordeaux mixture, of a strength of about 1lb. lime and 1lb. bluestone to each 10galls. of water.

All the melon family require abundance of moisture, and water should be applied in such a manner that the stems of the plants should not be covered—

by the stems is meant the portion arising from the roots—as often these become diseased and growth is checked. Running branches should be pegged firmly, and the points pinched out if a more branching habit is required.

Keep all beans picked from the bushes as soon as they begin to toughen, whether wanted or not, for the blooming and pod-producing period is lengthened by this precaution.

On the plains salad plants can be sown in cool shady situations, and where cheap bush-house shelters can be erected, they will be found great aids to producing succulent lettuces, radishes, and cress.

The seed stems should be cut away from beets, rhubarb, and parsley, the ground forked up and a good mulch applied, after which a soaking or two of water will work wonders for the beets.

In the hills and wet and cooler portions of the province experienced growers make sowings during this month of turnip, parsnip, lettuce, beans of all sorts, carrot, beets (red and silver), peas, spinach, cauliflowers, and cabbages.

In favored localities they also plant out cabbages, broccoli, celery, cauliflowers, &c.

## CAULIFLOWER DISEASE.

Mr. D. McAlpine, Vegetable Pathologist to the Department of Agriculture of Victoria, has furnished the following additional particulars of the new disease attacking cauliflower plants. He calls the fungus *Phoma brassicæ*:—  
“In every instance the superficial tissues of the diseased roots showed numerous, minute, black, cuneiform bodies, which never extended above the ground. The fungus evidently caused the roots to rot, although they remained quite firm, and consequently the green parts suffered more or less, according to the virulence of the attack. Black patches on the stem and occasionally on the leaves showed numerous threads of a fungus, but none of the minute black bodies were seen on the roots. On microscopic examination the fungus turned out to be a new species of *Phoma*, and the little black bodies on the surface were the cases containing innumerable spores which multiply and spread the fungus. As far as is known this is a new disease confined to South Australia, but there is a closely allied disease on cabbages and cauliflowers in the market gardens of Brighton (Victoria), known as black leg, from the appearance presented by the roots and the collar. It is caused by a different fungus (*Fusarium*), but the study of it may throw light upon the other. Black leg has been known in Brighton district for six or seven years at least, and always occurs on sour ground in sheltered and damp spots. It may attack the plants when 4in. or 5in. high, and begins in the beds, only appearing about December. It occurs, however, on old plants all the year round, and I obtained specimens to-day (October 21) on old stumps in the ground. The disease is not in the soil, as is the case with club root, and affected plants will still retain the disease in any soil. If the plants are healthy to begin with, there is no fear of disease in planting out, and the growers do not regard it as serious.”

**FLOWER FARMING.**—In the Riviera, Department of Maritime Alps, France, the most important industry is that of growing plants for perfumery purposes, and these are chiefly manufactured at Grasse. Wild flowers and aromatic herbs are also largely used. Connected with the industry are many others, such as artists for designing labels, &c., printers, carpenters for making cases for export of perfumery, paper makers, paper-box manufacturers, glassworks, makers of pomades, salves, &c., perfumed soap makers, carters, packers, engineers, and many others. The town of Grasse is of considerable size, and the buildings are imposing.



## ORCHARD NOTES FOR DECEMBER.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

In the drier orchard districts of the colony irrigation is the order of the day. This applies more particularly to localities where fine samples of fruit are required for supplying the fresh fruit market. Trees of the citrus family **require careful attention** in this respect. Most of our citrus plantations have presented a sorry spectacle this spring, and many owners will scarcely have any crop on numbers of their trees next season. Through some obscure cause, probably the perishing of great numbers of roots, the trees have shed their leaves almost entirely, and the terminal twigs have died. Now that young growths have come on again the trees are clearly indicating how much dead wood is present. With the average orange-grower the cutting away of these innumerable small dead twigs—though desirable, if not absolutely necessary, for the future health of the trees—is a costly time-devouring work, and the vastness of the work often causes it to be neglected completely.

That the root surface has been reduced is assured, and, in accord with all accepted rules of manipulation, the tops should be reduced to create a balance, and to do this it will both save time and future dying back if citrus trees affected in the above manner be headed down below the dead brushlike terminals. One prominent item in connection with this almost general dying back and leaf-shedding epidemic is the fact that the Seville varieties have stood through it all unscathed, in heavily or unirrigated lands alike, and this presents to my mind that, though generally considered less affected by abundant moisture, these varieties may be less injured by drought also. Peaches will be benefited by the judicious application of water, and one of our growers who produces a fine sample each year adopts the method of filling a wide shallow trench around each tree with fresh stable manure and then runs the water into the trench, thus washing the nutriment from the manure into the soil at once, while the insoluble refuse acts as a mulch to keep in moisture. However, this is not generally done until a little later on in the season.

The usual method of watering orange plantations by making rings around each tree is open to the objections that in young orchards the intervening dry spaces draw away moisture from around the trees, and in old orangeries, as everyone knows, the sub-surface is a network of roots; consequently the water only reaches a limited number of them when applied in this manner, and thus it would seem that the whole area should receive moisture. Of course this will be challenged on the grounds of practicability, but where enough water is available there can be little doubt of its accuracy.

A careful watch should be kept over newly-planted young trees for the purpose of manipulating the shoots as described in last month's issue.

Budding will be proceeded with during this month, and in selecting stocks for ordinarily good soils and positions it will always be a commercial success to select a stock of its own kind for each plant; thus, put peaches on peach, apricots on apricot, &c. It is well known that peaches are very often budded upon almonds, and it must be confessed the fruit has a finer color, but invariably gumming ensues at the junction, the boring caterpillars make an entrance, and gradual decay takes place. On dry limestone soils apricots are budded upon almonds, but very few instances of sustained success are found here where this is practised, and, unless the orchard be situated in a locality favorable for producing fruits at a season of the year when they command exceptional prices, I would say have nothing to do with foreign stocks, but of course where special objects are to be attained scheming is pardonable, for success in fruit-growing is generally reckoned by the accumulating cash.

Where water is abundant and the trees have merely to be lifted one by one

from the nursery ground and conveyed a few yards to the prepared position to receive them young citrus stock may yet be safely transplanted, but the work is risky, and requires care and experience to make it a success.

Towards the end of the month the fruit harvest will have fairly set in, and provision should be made at once for canning, drying, &c., by procuring the necessary appliances, or overhauling and putting in working order any that have been formerly in use, because when the fruit is ripe no time will be available for this work.

The season of thinning fruit is just about passed, and if a great quantity has been left upon the trees they should be assisted to carry their burden to maturity by every practicable means, such as water, manure, &c. Cultivation, for reasons frequently described, should be done after any thunder showers or artificial application of water. Suckers should be suppressed, and to merely hoe them off with the weeds accentuates the evil; they must be severed from the roots as close as possible.

Fortnightly sprayings with Paris green should be continued for codlin moth destruction, and careful attention given to the weekly examinations of bandages, and frequent gatherings of fallen or infested fruits from the trees. The infested fruits are easily detected on account of the reddish-brown borings hanging around the tunnels or sticking between the fruits. The simplest method of destroying the larvæ is to throw the collected fruits at once into barrels of water and allow them to remain there a couple of days. After this they can be fed to animals.

There has been a plague of green and striped caterpillars, but by the time these notes appear in print they will have probably run their courses and vanished. Scale insects will be breeding, and dressings of resin compound should be sprayed on to them as required. The most successful formula used here has been composed of 10lbs. soda crystals, 10lbs. common resin, 5lbs. soft soap, dissolved by boiling and diluted to make 50galls. for spraying purposes. Where this has been applied systematically the red scale has been reduced greatly on the citrus trees—more particularly on the orange.

## PARIS GREEN AND CODLIN MOTH.

Mr. James Fletcher, Entomologist and Botanist to the Department of Agriculture, Ottawa, Canada, in a letter to the General Secretary, Bureau of Agriculture, South Australia, under date September 16, 1897, says:—"The efficacy of spraying with Paris green to prevent injury by the codlin moth is now so well recognised in this country that the matter is seldom discussed, and all of our leading fruitgrowers practice it regularly." In a calendar for fruit-growers sent at same time, it is recommended to spray with Paris green four times, in each case in conjunction with Bordeaux mixture for suppression of apple scab, codlin moth, &c.

## ITEMS ABOUT APPLES.

In the British markets Spanish and Portuguese apples are of inferior quality, and bring only 4s. 6d. to 7s. per 112lbs. during August and September. Superior kinds usually sell at much higher prices then. British markets begin to get bare at end of January, and sometimes, when seasons are bad in England, the supply fails by beginning of November. Canadian and American apples are then used. American apples are sent in barrels, not quite 100lbs.; Canadian net 130lbs. to 140lbs. per barrel.

For centuries past all authorities have lauded the apple as being particularly wholesome and contributing to good health. Where so many doctors are

agreed, and for so long a time, there must be a good foundation for the opinion. The delicious, spicy, aromatic, sweet, ripe varieties are recommended—not sour, unripe, hard, indigestible sorts. John S. Linsley, M.D., recently wrote that “a man needs the apple to keep him from growing prematurely old. The apple is the fruit which tends to prolong youthfulness and robust vigorous health.”

In 1896 the official statistics showed that 678,000,000galls. of cider were made in France during 1895, and of this only 500,000galls. were exported. In France cider is considered to be the most hygienic of all drinks.

Cider may be kept at any stage of sweetness by adding three-fourths of a pint of grated horseradish to each 60galls., and then stirring it. This stops fermentation. After a few weeks rack off into clean kegs, and bung up close.

In all cider-producing countries there are cider mills and presses, owned either by private persons or by companies. Growers of apples, pears, and other fruits, which are usually converted into “fruit wines,” cider, perry, &c., take their fruit to these places, where it is manufactured under skilled superintendence. In some cases the owners take back the manufactured product, in other instances the raw material is purchased by the owners of the mills.

Dried apples should be only of the very best and soundest cooking varieties, quite ripe when dried in the sun or in the evaporator. Any one who sells poor-quality fruit may cheat his customer once; but he spoils the trade in future for himself and for others. In the early days of South Australia, we used to get splendid “pippins” from Normandy, France, in small round flattish baskets, holding about ten pounds; and from Cape Colony we had excellent stringed sliced apples, pears, and peaches. These were followed by similar importations from other countries, but often much inferior in quality. Result, not wanted—especially when, much later on, our own manufacturers began to supply an excellent article. There is still, however, room for a very great extension in the sale of desiccated, dried, or evaporated fruits of first quality.

The *American Cider and Vinegar Maker* of May 12, 1897, says that the American Consul at Chemnitz, Germany, writes that American apple growers have waiting for them a field for the marketing of their fruit, the possibilities of which they can form no idea. “An average price for (American) Baldwins in Germany is \$7.14 (£1 9s. 7d.) per barrel of 2½bus., and they are frequently bought with readiness at much higher figures.”

Apple butter is a standard delicacy in the United States. They use steam now for evaporating the main portion of the watery constituents of the crushed apple, which is reduced to the consistency of glue almost; and, without sugar, will keep good for years.

In picking apples the fruit should be lifted upward, so as to avoid breaking off the fruit-spur to which it is attached, and upon which apples next year would be produced. Take care also not to injure the tree with the ladder. Pick into moderate-sized baskets, and do not bruise the fruit.

Apples for storage through winter should be picked before they are quite ripe, with great care to avoid bruising. Sort them, and refuse all that are not perfect in every way. The culls may be used at once or as soon as possible. The storage place should be dry and cool, with plenty of fresh pure air, but not subject to strong draughts. Do not pack more than 12in. deep.

The acids of fruits materially aid in digestion of fatty matters in other food, and also purify the system. Apples and pears are well provided with these properties, and have been recognised as promotive of good health during many centuries.

“Cider jelly” is the thickly-condensed juice of apples, without any added sugar. It will keep good for several years, and is used for making summer drinks, as a healthy beverage for sick people, and at table just as other jellies are used.

## WHY ARE OUR CITRUS TREES DEFOLIATED?

BY GEORGE QUINN.

The condition of their trees will cause many orange-growers to remember the spring of 1897; and no doubt when the harvesting season arrives next year the impression will be intensified. With few exceptions along the valley of the Torrens the trees have shed vast quantities of leaves; and when they should, under ordinary conditions, have been in full bloom they were leafless and blossomless. Consequent upon the shedding of the leaves the terminal twigs have died or are dying back, leaving the trees in a similar plight to those seen in many plantations in other colonies after seasons of neglect. To the gardener who has been trained in closely watching the growth of difficult plants under pot culture the death of the terminal shoots at once suggests a cessation of root action. With the pot plant he would act promptly in the direction of turning the plant out, the roots would be examined; if found decaying the ball of earth would be lessened or completely shaken away and the decayed roots removed. The plant would be potted into fresh soil, not too rich, but wholesome, in a smaller pot; the dead top would be cut back to healthy wood, and the plant would be placed in a favorably sheltered position to recover itself. Should there be any blooms or fruits they would be removed.

Here seems to be a parallel case. Where a pot plant has been growing healthily and water has been suddenly withheld or given in insufficient quantities, or the drainage has become clogged and the ordinary supply has been accumulating and becoming stagnant, this root-decaying action has set in, with the results presented above.

As far as my observations go, these injurious effects are most noticeable where a considerable amount of irrigation has been carried on. In orangeries where the trees—young, medium, or old—were a picture of apparently perfect health a year ago some of the worst specimens are found. Is the damage due to the soil becoming dry in the early winter, when the cool temperature and light showers had caused artificial watering to cease? It is well known that no soaking rain fell in 1897 until well on in June, whereas in previous seasons April and May generally saw the ground well wetted; or is it due to the curtailed supply of water in most localities during last season having failed to keep sufficient moisture about the roots after two winters of insufficient rainfall to properly wet the subsoil? Whatever may be the cause, it is certain that the trees growing on soils of a comparatively stiff character have suffered least. Very noticeable exceptions are seen in the cases where Seville or bitter oranges are growing amongst the sweet varieties. The former seem to have quite escaped the evil effects, and are as fresh as ever.

I mentioned this to one of our most experienced growers, and remarked that probably it pointed to the Seville possessing a hardier and more drought-resisting constitution, more particularly in its rooting, and hinted as to its use as a stock for dry positions, it generally being admitted that it will hold out better in wet positions. He very pertinently argued that the old Sevilles seen in good health were most probably worked on sweet orange or lemon stocks, as was the custom at the time they were planted. However this may be, it is a matter of importance to orange-growers to know the cause of the injury, and to counteract it as far as possible; and there is no doubt some of our experienced growers can, if they choose, supplement these observations with opinions of considerable value. These effects seem quite distinct from the patchy dying off of twigs so prevalent in the autumn of this year. The resuscitation of the

damaged trees will necessitate cautious treatment, and growers will do well not to rush to excess in water or manure, but to increase the applications only as the growth proceeds. The decayed roots cannot be removed, but the injured tops could be cut back to good healthy sound wood as soon as possible, and if scale insects are present it would be an opportune time, while the trees are open, to apply remedies.

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## SULPHURING FRUIT.

Sulphuring of fruit is done with the object of bleaching and making it look more attractive. A light sulphuring for fifteen to twenty minutes will not injure the flavor of fruit to any appreciable extent, if it is afterwards dried by fire-heat; but fruit should on no account be left longer in the sulphur-box. The trays should never be made of metal, since the sulphur fumes act upon iron, tin, lead, &c., and the fruit is made more or less poisonous. Galvanized wire trays produce sulphate of zinc in the fruit, and other metals produce other poisons. For sulphuring fruit the trays could be made of split cane or bamboo. The cheap baskets from the sugar refinery could well be utilised for sulphuring trays. Trays made with cheesecloth bottoms are really cheap, handy, and effective. If the public could be made to understand that unbleached fruit is much more wholesome and better in taste than that which is made white and "pretty" by the use of sulphur, it would prove beneficial to their digestive organs and profitable to their purses, because sulphuring costs money, and it depreciates the flavor and true quality of the fruit. So long, however, as the public insists upon pale-colored fruit—as it does also upon high-colored cheese and butter—it is necessary for the producers to comply with the demands, and long for the time when better knowledge shall guide them in providing for "the inner man." A practice prevails with some people of bleaching highly-dried fruit, or that which is dark in color. This destroys a deal of the natural flavor, and impregnates the already dry fruit with sulphuric acid, an antiseptic which impedes digestion and causes headaches. As before stated, when the fresh sliced fruit is sulphured, and then put through the evaporating machine, a good deal of the sulphuric acid is driven off again by the fire-heat. Where a large evaporating business is conducted, it is necessary to have several sulphuring boxes into which the fruit is carried on tramlines or "ways." The sulphur-boxes are built or made airtight, and each box is about 6ft. wide, 10ft. long, and 6ft high. The trollys are loaded up with several trays of sliced or prepared fruit, each having a high rim at two ends, to keep the trays separate, and to allow of a free circulation of the sulphur fumes. The trays are about 3ft. wide and 9ft. long, and from twelve to fifteen are packed on each trolley. The door of the sulphur-box runs up and down in grooves, and is suspended by ropes at each top corner, running over wheels, balanced at other end of rope by kerosine tins or buckets filled with sand or stones. A hole is dug under one side of the box large enough to admit a pan containing about 3lbs. of sulphur, which is placed inside the box, set on fire, and then closed over with a board. Fifteen to twenty minutes is quite long enough, but some people submit the fruit thirty to forty minutes. The riper the fruit the less the time required to sufficiently bleach it. It should be noted that sulphured fruit is prohibited for sale in several European countries.

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**COOLING FOR IRON ROOFS.**—Melt half a bucket of size over a fire; then gradually add and stir in 6lbs whitening. Then mix in enough warm water to reduce it to the consistency of thick cream. Apply hot to the roof on a fine day. This will not injure the iron. Some of the cooling compositions eat into the metal, and in time holes may appear.

## EVAPORATED FRUITS.

In several respects there are advantages attached to the practice of drying or evaporating fruits which do not appertain to fruits preserved in weak syrups or to those converted into jams, marmalades, &c.

In the first place, very much larger quantities of fruits can be dealt with; no sugar is required; cans, bottles, and other small receptacles are not needed. A large bulk of fruit is reduced to small dimensions and little weight, so that cost of freight and carriage generally is decreased to the lowest point. If the fruit is well and properly desiccated, it will keep all its characteristics and perfection for a long time, and when required for use, all that is necessary to restore it to all the perfection of fresh fruit, for cooking purposes, is to soak it for thirty-six hours in four times its own weight of fresh water. It is desirable, however, to give it a preliminary soaking for half an hour in a good quantity of fresh water, and rub it through the hands to remove any dust which may have become attached.

Advocates of sun-drying of fruit are very firm in the opinion that this system is by far the most perfect, and they advance many arguments in favor of this contention. If it is stated, in opposition, that the fruit is liable to get dusty, they show triumphantly that the trays are spread on green lucern fields, where no dust can arise. They say that the moths do not deposit eggs upon the fruit; or, if they do, that the sun-heat kills the eggs; and they maintain that the flavor, appearance, and all other characteristics of good sound dry fruit are secured when it is properly dried by the heat of the sun. And there is no doubt that dried fruit of very superior character can be, and is, brought upon the market by those who practice the art, and have become skilful in drying fruit by the heat of the sun.

So far as raisins and currants are concerned, and perhaps also figs and plums, there are many strong reasons why growers should adopt the sun-drying process; but it must be borne in mind that an immense number of trays are required to do any considerable business, and that most of these fruits can only be so treated where there is a certainty of long-continued fine, clear, and really hot weather. Where such conditions do not prevail to a certainty, resort must be had to fire-heat in order to ensure success every time, and when this has to be done on a large scale it will pay best to co-operate, erect a suitable plant, and employ a skilled man to oversee all operations.

The advocates of fire-heat bring forward some arguments in favor which cannot be controverted. They claim that the fruit is reduced with absolute certainty to its proper condition of dryness within a few hours, with no risks from a change of weather after it has reached the factory. It is claimed that the albumen of the fruit remains unchanged in its soluble digestible form; that the flavor, aroma, and other desirable qualities are perfectly preserved; and that no moths or insects can possibly be produced in the dried fruit if it has been passed, as it should be, direct from the evaporator into a moth-proof room to be cooled and packed.

Great claims have been put forward both by the makers of the horizontal and the perpendicular evaporators, but the majority of those who use these machines favor the perpendicular. The horizontal machines are slower, and the vapor from the fruit ascends above the trays. The temperature does not usually exceed 200° F. The upright machines in some cases subject the fruit to a temperature up to 240° F., but by passing through more rapidly, and being subject to the vapor arising from the lower trays, there is most assuredly no "cooked" flavor imparted. Both types of dryers claim to close up the outer surface of the fruit when exposed to the first fierce heat, "hardening the albumen," and retaining the albumen in the centre in its original condition.

In the upright evaporators there is first the furnace-chamber, where heat is generated and radiates from the iron furnace-box. All smoke, of course, escapes at back through a flue, and the heat ascends to the floor above, where the trays of fruit are passed through a slot into the shaft. The trays rest one upon the other, and are lifted bodily every time a fresh tray is placed beneath. The trays are made with cane-net bottoms by preference, or woodens slats, or black iron wire, and sometimes galvanized iron wire. The use of metals where the fruit is sulphured is objectionable. The pile of trays is lifted by a leverage contrivance up to a certain position, when clutches spring from the sides of the shaft and retain the pile of trays whilst the carriage descends a few inches to allow of the next tray being inserted. Some fruits can be dried within three hours, whilst others take perhaps eight or ten hours—ascending the shaft slowly all the time. On the third floor the shaft stands only three or four feet, and the trays of fruit are removed, examined, and if dry enough—as is usually the case in a well-managed concern—the trays are at once removed to the moth-proof room, the fruit thrown into bins to cool and “sweat” for a time. The “sweating” results in moistening that portion of the fruit which may have become a little too dry, and in drying that which may have been a little too moist when taken from the shaft. The size of the trays depends upon the size of the evaporating shaft.

Mr. T. B. Robson, Hectorville, makes use of an evaporator of his own construction. He says:—

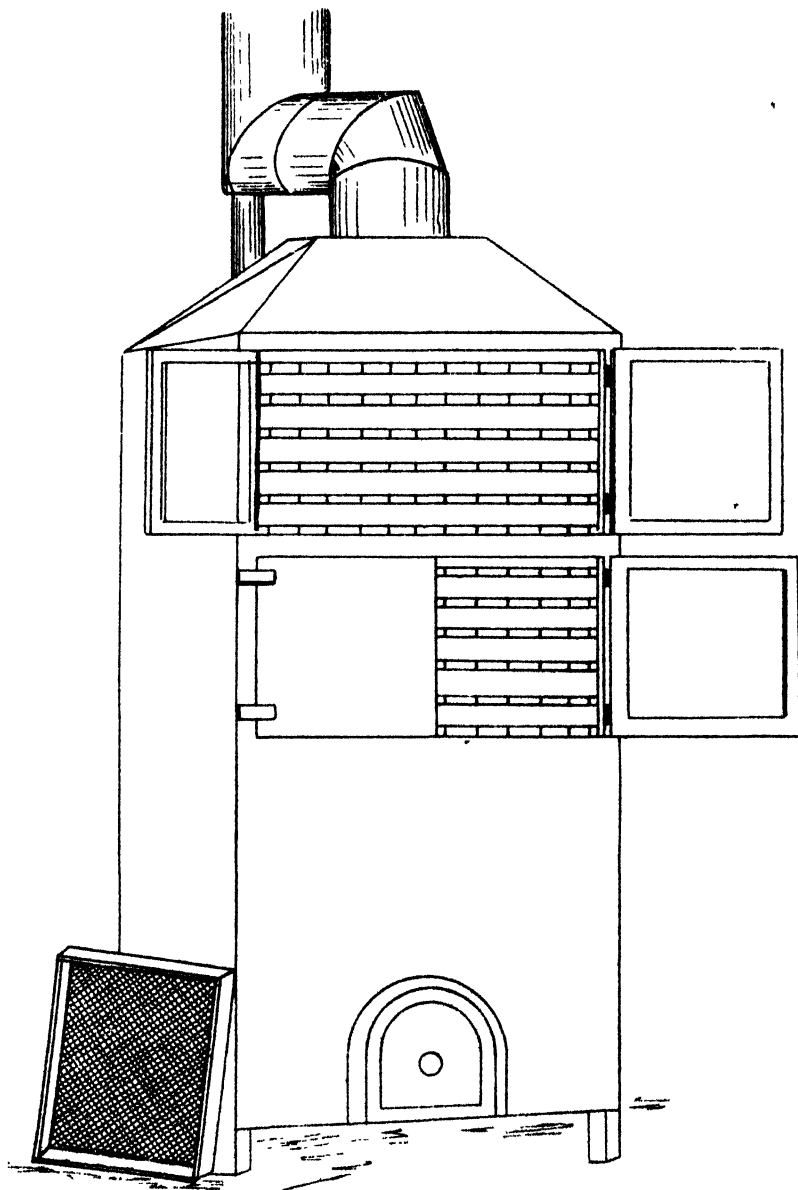
An evaporator is a great help, as if wet weather comes on fruit can be saved which would otherwise be lost. A cheap and effective evaporator can easily be made by sinking a 200 or 400 square iron tank in the ground (an old leaky one will do quite well) to contain a stove. A stokehole must be left alongside the tank with an opening to get at the stove and admit air. The stove-pipe must be taken out through the side of the tank. The top of the tank must be removed or enough of it to form an opening the size of your trays, which must be made of 1in. boards 4in. broad for the sides, to form a tray 4in. deep, the surface of which is made of galvanized wire, 1in. mesh is large enough for raisins, but it comes expensive. I am using 4in. wire net which is much cheaper. It is right enough for large fruit, but with raisins it requires care, as the small fruit is apt to drop through. If these trays are carefully stacked over the opening of the tank, the sides of the trays will form a column through which all the heated air from the stove will pass, carrying away the moisture of the fruit with it. Fresh air to be heated is admitted at the stokehole at the bottom of the tank. By a simple arrangement of levers brought to bear on the bottom tray the whole column may be lifted 5in. or 6in., and a fresh tray of fruit inserted at the bottom in the greatest heat, whilst the trays of dried fruit may be taken off the top. The fruit must not be spread too thickly on these trays, as there must be room for the air to pass through. This is the best form of evaporator, because the whole of the heated air has to pass through the trays of fruit, and there is no waste. If too much heat rises up directly over the stove it may be spread by suspending a flat sheet of iron or tin a short distance above the stove. Gas coke will be found the best fuel, if it can be obtained, as it gives a good steady heat and requires very little attention.

Peaches, apricots, cherries, freestone plums should be split and the stones removed before drying. Apples, pears, quinces and peaches are generally (but not in every case) peeled. Where white apples are wanted the fruit is peeled, sliced, or cut into quarters, halves, or only peeled and cored, dropped at once into tubs of water containing one ounce of salt to the gallon, then spread thinly on trays made of cheesecloth, sulphured fifteen or twenty minutes; then transferred to the drying-trays, and placed in the evaporator. Peaches, apricots, and split plums are dried on trays with the cut side upwards. Pears are dried flat side down, and should be pared and cored. Clingstone plums are dried whole.

Leaflets upon utilisation of fruit, &c., fruit-drying and similar subjects can be obtained gratis on application at the office, or will be sent by post if stamps for postage are forwarded to the General Secretary of the Agricultural Bureau, Adelaide.

## EVAPORATORS FOR FRUIT AND VEGETABLES.

There are a great many evaporating machines in use; but nearly all are upon the same principles, with variations in the method of application. The machine illustrated here is one of the old form.



It is called "The Zimmermann." In the lower part is the furnace, occupying only a small space, with its flue (not visible there) through the back of the machine—it can be seen at the top, where it enters the flue from the tray space.

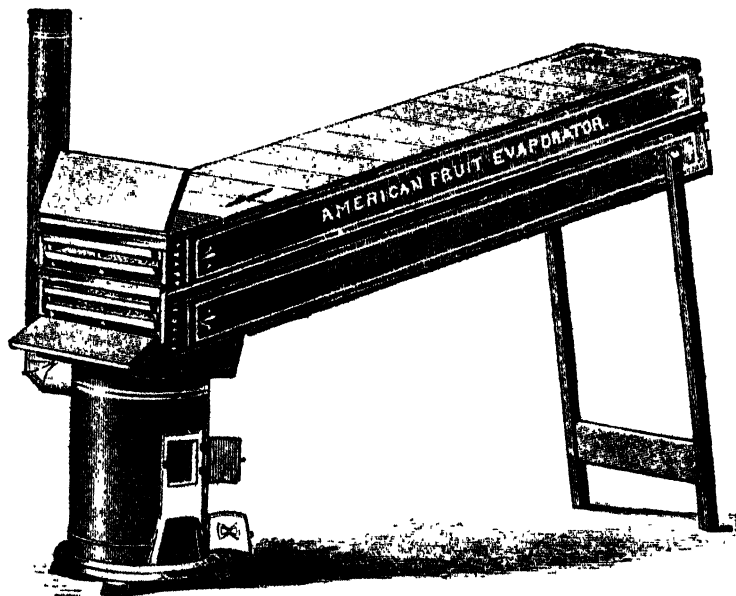


No smoke, of course, can be allowed to pass through the space where the trays of fruit, &c., are to be desiccated. The heat from the stove radiates through the iron into the space beneath the trays, flies upwards, passes through the wire bottoms of the trays, over the fruit, &c., and finally escapes through the large flue at the top, carrying off with it the watery portions. There are several hinged doors, which can be opened for inspecting the progress of the fruit or other articles. In this form of evaporator the trays can only be shifted by hand, which is troublesome.

Small fruit and vegetable evaporators are used by housewives, who employ the ordinary cooking stove for supplying the heat. The evaporator may be made of galvanized iron, 3ft. high, 2ft. wide, and 2ft. deep, with a series of wire trays on clips, a door in front, and a small aperture on top to let the vapors escape.

Evaporators for commercial purposes will justify the use of more expensive appliances. The favorite form at the present time is the upright one, having a furnace room on the lower floor. The fruit is prepared, sulphured (if necessary), placed on the trays, and inserted in the evaporating shaft on the next higher floor. The trays of fruit are now always placed below those which have already been put in. The whole pile of trays of fruit is lifted by a lever, and carried on a platform to a height of about 10in., where they are retained by clutches, and the platform is then returned for reception of a fresh tray, and each tray, as it arrives, is removed from the open top of the evaporating shaft on the top or third floor, whence it is at once removed into the moth-proof room, placed in bins to "sweat," and "even up," and finally it is packed into boxes for marketing. An excellent example of this class of evaporator may be seen at work at Evandale, near Angaston; and another very good one has been erected by Mr. F. A. Pulleine, near Lobethal.

The inclined form of evaporator can easily be understood from the following illustration of the "American," below: but it must be understood that there are numerous other forms used in America, and that the name has been adopted simply as a trade mark:—



This is a compromise between the upright and horizontal forms. The furnace is not open at top, but the heat radiates through the top plate and sides into a small chamber, into which no smoke can enter; it then passes upwards through the machine. The trays of fruit, &c., are put in through the openings shown in front, and pushed along on slates or runners to the upper end.

Grain, nuts, fruits, vegetables, meat, fish, oysters—in fact, any food substance—can be evaporated by fire-heat, so that it can be kept good for any reasonable length of time. When required for use it is only necessary to wash the articles, and soak them for about twenty-four hours in four to six times their weight of water, and then cook them.

## THE VINEYARD.

### NOTES AND HINTS FOR DECEMBER.

*Written for the "Journal of Agriculture and Industry."*

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

The flowers are set, and we are now in a position to form some idea of the crop which the vines are likely to carry during the course of the season. November weather cannot be said to have been altogether favorable to heavy setting—it was too fitful and stormy; though during the calm and abnormally hot days which characterised the past month many of the flowers were successfully fertilised. On the whole, the setting would appear to have been fairly satisfactory, though in bleak, open localities exposed to the violence of the winds some varieties have proved refractory, notably Malbee, Muscatel, &c. Should we be favored with December rains the crop should be above the average.

There is little to be done in the vineyard in the course of this month. The soil should be free of weeds, and present a loose, smooth, even surface. Unless it rains it will be unnecessary to scarify any further, so as to avoid as much as possible bringing to the surface moist layers, subject to evaporation.

Grafts should be disbudded; trellised vines tied up; young vines protected against the night caterpillars.

## THE FARM.

### SEASONABLE NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL ROSEWORTHY  
AGRICULTURAL COLLEGE.

Harvest follows hay-time closely this season. Where crops are cut and thrashed the binder may be cutting for hay one day, and for grain on the day following, and even where the stripper is used there will be difficulty in securing all the hay before the wheat is thoroughly ripe.

It is a grave blunder to allow hay to stand too long in the field, or wheat to be left after it is fit for harvesting. One sees frequently hay left out to be sun-bleached and depreciated long after it is fit for loading. One day, such as was the 19th of November last, or even a day considerably less boisterous, may cost a farmer who is behind much more than would have paid for the extra labor and implements necessary to enable him to keep abreast of the work. To begrudge extra labor at this season is not economy—it is a penny-wise-pound-foolish practice. Every year in the colony there is loss considerable—

occasionally very considerable—through hay being left unstacked or wheat unreaped long after they should have been secured.

The mode of harvesting is not now so frequently discussed as was the case four or five years ago. The relative utility of the thrasher and the stripper is apparently better understood, and it is now more generally recognised that for each there is a legitimate place in our farming. Stripping is the cheaper mode of harvesting, and the most expeditious, where grain only is taken account of; and by means of its use land has been profitably cropped which otherwise would be outside the margin of cultivation. In the drier districts, its position as the more useful and the more profitable harvesting implement is not questioned; but where the average rainfall reaches 18in. or over, and average yields from 15bush. upwards can be harvested with ordinary cultivation, I am inclined to plump in favor of the thrasher. Where there is a possibility of disposing of some of the straw, I would vote unhesitatingly in its favor. The position may be briefly stated—

1. By using the binder and thrasher one can have wheat cut at least a week earlier than it can be stripped. This is an important gain, for—

(a) There is less risk of fire.

(b) Less risk of having the crop shaken out by boisterous “warring” winds. Few farmers have not had expensive experience of what a stormy day will bring about in wheat almost ready for stripping. Of course it is not to be overlooked that during a spell of rainy, moist weather, the wheat may be better standing than in the stook; but rain is much less frequent than rough winds at this season.

(c) The ravages of rust are not so pronounced as the grain is slightly less shrivelled.

2. If wheat be cut with a faint touch of green still showing at the nodes, and while the grain is soft without being milky, the sample will be better in every way than if it be allowed to stand until dead ripe—

¶(a) The grain has a brighter, more marketable color.

(b) It weighs better.

¶(c) It yields weight for weight more flour

Boussingault, who made chemical investigations in this relation, stated that in the samples he examined he found 7 per cent. more starch in that cut in good time—ten days before fully matured—than in the sample allowed to stand until dead ripe. He found also that the percentage of grain-covering, or bran, was less by 3 per cent. in the wheat cut early. These investigations were made in France. We cannot in this climate cut wheat so green as can be done with advantage in Europe, as it ripens much more rapidly here, and as the straw has less moisture in it, and the transference of cells contents from the stems to the ear stops sooner after the straw is cut than in cooler, moister climates.

3. The straw is secured after thrashing, and being cut sooner it has slightly better marketable value, and slightly better feeding value. The price of straw within my experience has ranged in Adelaide from about £1 up to £4 per ton, and about 35s. for baled straw is, I believe, somewhere near the average price. With the modern baling presses, which the General Secretary of the Agricultural Bureau is so legitimately advocating, straw can be baled from the thrasher at very small expense. At the trial of hay and straw presses held by the Royal Agricultural Society of England, at Nottingham, in 1888, the first prize machine baled at the rate of 14 tons of loose straw per day, at a cost for labor and power of 1s. 2½d. per ton, and of new hay, 33 tons at a cost of 6d. per ton for labor and power. The implement was quoted at £80 to the judges. The railway freight on baled straw is of course considerably less than on straw lightly pressed and trussed (the machine referred to above pressed the straw to a mean density of 13½lbs. per cub. ft., that is to 3¼ cwts. per cub. yard), and

when a press is used the straw can of course be sent further. I take it, then, that the price which can be obtained for pressed straw in Adelaide is sufficient to pay the whole harvesting expenses—binding, stooking, carting, thrashing, baling straw, and freight thereon for a distance of thirty or forty miles at least—so that the cost of thrashing compared with stripping is handsomely returned.

I do not forget that straw can be readily gathered after the stripper. A side-delivery machine, or a binder working immediately behind the stripper, and in the opposite direction, makes a very fairly clean job of the work. The straw bound behind the stripper is better for thatching than that thrashed, but only in that direction does any advantage in its favor occur to me. Straw from a crop cut early and thrashed, as has been said, is better in itself, and the bruising which it receives in the course of passing through the drum of the thrasher enhances its feeding value. With a side-delivery machine there is, of course, no expense for twine, but it is less readily handled, and can be carted in fewer days. Rolling or dragging down the straw, and gathering it with a horserake, is a primitive, slipshod practice. Last season's experience, and indeed this year's before it is complete, if one may venture to prophecy, will teach us a lesson in saving straw. *Three pounds for straw, and sixpence a bag for cockey chaff*, are facts which even the most unthrifty among us will scarcely fail to note, and no doubt the abundance of straw of fat years will, for a time at least until the experience is forgotten, be stored up for the poverty of lean years of the future. Baled straw from the thrasher can be very readily stored in small spaces.

There is an implement now being used on many farms which, in the absence of experience of it, I do not consider has much in it to encourage one to use it—I mean the header. I confess candidly that I have not worked the machine, and that very probably I undervalue its merits, and further, that I merely express preliminary impressions of it. I will say, however, that in my notions the machine looks to be a bastard. Its first purpose, apparently, is to enable the farmer to take the grain out of late cut hay or early cut wheat for grain, in order that he may have the grain, or as much of it as he can thrash out, and at the same time have the straw for sale as headed hay—a something to be mixed with good hay to be chaffed. There is surely enough and more than enough of inferior chaff already on the market. It is a vain delusion for men to think that they can, by means of this machine, obtain wheat and hay. What they do obtain is wheat and straw, similar to straw from the thrasher, with the difference that more grain is left in the straw—how much more is indefinite, and depends on several contingencies. With the thrasher more can be got through in a day than with the average header, and from the thrasher the grain is cleaned, graded, and bagged ready for the market, while after the header, or at least after some headers, the grain has to be winnowed from the heap of grain and chaff as after the stripper. If screens are attached to the header, it becomes almost as complex a machine as a thrasher; but its work is less satisfactory, in that the amount of grain left in the straw can only be guessed at. The extension of the use of the header will, I fear, affect the good name of South Australian chaff. One inducement to use it is found in the fact that it costs less to purchase than a thrasher, but I believe that if our implement makers will direct the ingenuity and the skill now devoted to this machine to bringing out a thrashing-machine suited to our conditions, they will be able to build an implement much more adapted for our use and at a much cheaper price than English machines are now imported and sold. They, themselves, as well as the rural interests, will be the gainers. The English thrashing-machines are heavy, clumsy, and unnecessarily complicated and expensive for our conditions, and I believe they could just as readily be improved, from our point of view, as have been the seed-drills, for example, within the last few years.

I trust that the introduction of the headers may not be the means of delaying the introduction of the thrashing-machine which has so much to recommend it in our most favored districts. One matter in relation to this cutting of wheat before it is dead ripe must not be overlooked. It is this—*When grain is intended for seed it is desirable to allow it to be fully matured before harvesting.*

This is another matter which may be briefly referred to in this month's Notes, namely, the selection from the crop of ears which stand out prominently from the surrounding crop as superior in some desirable quality or qualities such as length and shape of ear, early maturing and rust resistance. The securing of improved varieties of wheat, and the maintenance of qualities already good is effected or largely assisted by such selection. The work is not difficult; patient careful observation and the will to exercise such care will work out to much advantage. The finest ears and those having in marked prominence the characters which distinguish the variety from which the selection is being made, are those to be selected for future seeding, and selection or culling. The character of the straw—whether it stands up well, and its length and density—and the degree to which the plant has tillered should also be taken into consideration in making a selection. This practice has long been recommended. Writers, ancient as well as modern, ascribe to it the securing and maintaining of our best wheats. Virgil, for example, noted the tendency of cereals to degenerate—

Unless the peasant with his annual pain,  
Renews his choice and culls the largest grain;  
Thus all below, whether by Nature's curse  
Or Fate's decree, degenerate still to worse.

## THE DAIRY.

No one in the world, probably, will dare to say that there is less pain to the animal and less trouble to the operator in cutting off the full-grown horns of a cow or bullock than in preventing the first appearance of those weapons on the head of the calf. When the calf is two to four weeks old the first signs of horns begin to show in the form of a thin shell on the bosses. If the hair is then cut around the bosses the shell or horn lightly moistened, and then rub the moistened place with a stick of lunar caustic (caustic soda) till the place begins to look red, it will prevent any horns appearing. Do not rub the caustic on the surrounding surface.

The eight young Jersey bulls lately purchased by the Department of Agriculture have been sent out to the care of as many Branches of the Agricultural Bureau in various parts of South Australia. Care should be taken not to give them too much work, and to mate them with some of the best milking cows in each locality. All heifer calves, of course, should be saved alive, but bull calves should not be saved for breeding purposes unless the mother is also a pure Jersey cow. In all cases an effort should be made to give the bull liberty in a strongly-enclosed paddock, where he can get under shelter from heat or cold. Bulls kept closely shut up in pens are very likely to become savage and dangerous.

A half-bred, or mongrel, bull cannot improve the dairy herd to any extent. In this matter it holds true that "the bull is the herd."

"Lumpy jaw" (actinomycosis) in cattle is caused by a fungus, the spores of which are found on grasses, and gain an entrance to the tongue or gums through sores in the mouth of the animal. It causes "wooden tongue," "lumpy jaw," and other tumorous diseases. There is no shadow of doubt that the disease is

communicable from a badly-diseased animal to another which may be perfectly healthy. It may be communicated through the drinking water or by means of grass infected by the saliva of diseased animals, and may exist in other parts than the mouth or jaws. Even bad cases may sometimes be cured, and early stages are easily controlled by administration of iodide of potassium in drachm doses in solution twice daily for about two weeks. The disease is not easily transmissible through herding or contact, but usually is acquired through fodder or water taken into the mouth.

Anything that worries a cow is liable to affect her milk. It is not only the hunting with dogs, pelting with stones, beating with sticks and other weapons, but the presence of strange dogs, or strange people, or loud noises, or any exciting cause, will annoy the cows and affect the quantity as well as the quality of the milk. If the cow has been used to feed whilst being milked she will be troubled if her feed is withheld. The one person should milk the one cow regularly, because strange milkers upset the equanimity of the animal, and she will probably hold up at last a portion of her milk, that portion being the richest in cream. A very little milk lost each day from each cow in a herd of, say, twenty would amount to quite a large total by the end of the year—enough, probably, to pay the wages of a couple of good milkers.

Shelter against heat, cold, wet, and wind will save food and preserve the health of cows.

Odor of any kind will spoil milk, even if exposed for a few minutes only.

Everything about the milking shed and dairy must be scrupulously clean.

Any cow that shows the slightest signs of bad health should be turned out of the dairy herd at once.

Milk from a newly-calved animal must not be used until after the fourth day, sometimes later.

Salt is a necessity to good health. Cows especially require salt, and if deficient in the food it should be supplied.

No dairyman can make the best use of his dairy herd unless he provides plenty of green or succulent forage for them, especially between January 1 and August 30.

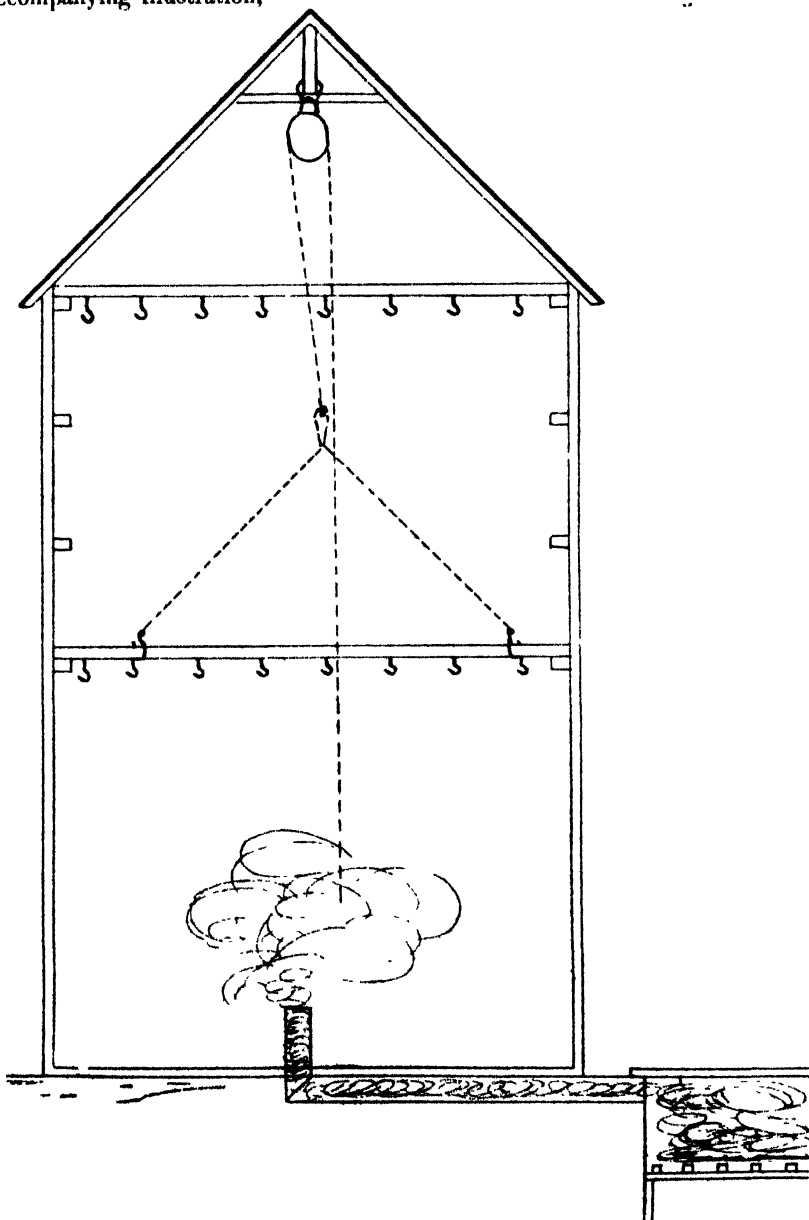
Clean the udder and the hands before milking, and remove the milk both from the cow and the yard as quickly as possible. Then strain, aerate, and cool it.

See that the temperature of the night and morning milk is alike at the time of mixing. It is best to keep them separate if taking the milk to a creamery or factory.

**CAPERS.**—In the department of the Bouches-du-Rhône, at Rouquevaire, the best capers are grown to the amount of about 220,000lbs. annually. The growers have formed a co-operation in consequence of depression in prices brought about by local traders mixing inferior Algerian and Spanish buds with the fine qualities produced in the district. The co-operators carefully grade and assort the capers, after they have been duly preserved, and thus have recovered the good name which their products had always previously enjoyed. Capers have been grown in Provence since ancient times. Here the flower buds are picked very small, mostly by women, at intervals of five or six days, then put into wine vinegar, provided at cost price by the Association, left in this for two or three months, then sifted by hand, and replaced in fresh wine vinegar at the Association cellars, and kept in barrels until sold. The buds are sorted into six classes, the best being about £4 per cwt. An average of about 4d. per lb. is realised by the growers. Other co-operations have lately been formed in neighboring districts with similar objects.

## A SMOKEHOUSE CONVENIENCE.

Needless labor is a waste of time and energy, which might just as well be devoted to some other useful purpose. In gathering fruit and in hanging up hams and bacon in the smokehouse there is no useful purpose served in climbing ladders if the work can be done upon the solid earth. By affixing battens or quartering to the walls of the smokehouse, as shown in the accompanying illustration,

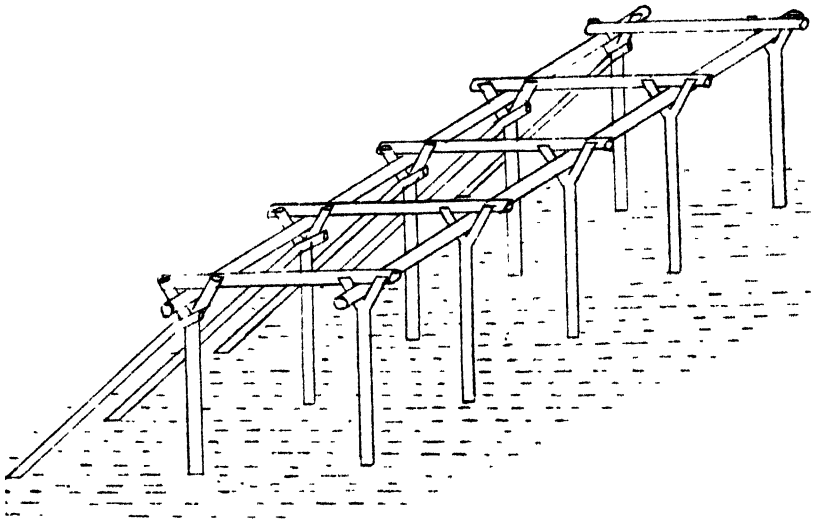


a deal of climbing can be avoided. The hams, &c., should be hung upon the hooks; then the beam can be hauled up to the proper position, diagonally; then with a light pole turned round, so that the ends will rest up on the battens, the hooks at ends of the bridle-rope can easily be detached by aid of the same pole, and another beam can be affixed to the hooks. The pulley-block at top should be fairly large and strong.

Cool smoke is essential to the good keeping quality of smoked meat. The fat is enclosed in small bladders or globules, and if too much heat is employed these burst, and the oily portion becomes oxidised and soon turns rancid or rusty. In all well-managed smokehouses, the furnace is made outside the house and the smoke is carried into the place through a tunnel, as shown in the illustration.

## CATTLE SHELTERS.

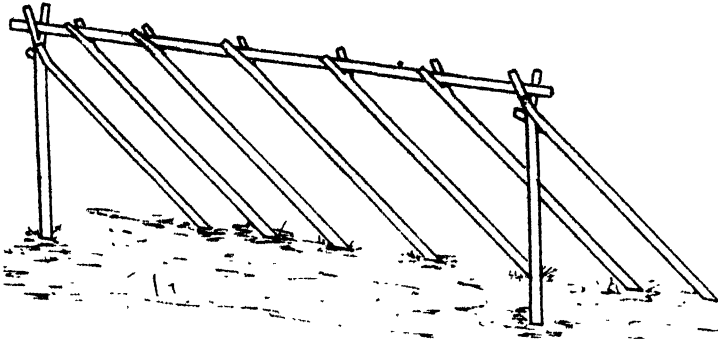
Apart from the humane aspect of the question it is severely economical to provide shelter for all of our domesticated animals. It conserves their health and saves waste of "condition"; therefore less food is required. This is a subject that ought to be considered carefully by every member of the Bureau and by every farmer in the colony. The framework of an excellent cattle shelter is here submitted:—



The above can be extended to any length, and should have straw stacked upon it to any extent. If several more bays are added some of them can be enclosed by rail or hurdles and temporarily used to shelter stringbinders, winnowers, &c. The stock will pull down and eat most of the straw in time, and a good deal of manure will have to be carried out regularly to the pits or directly to the fields. The framework should be so fixed that the prevailing winds cannot blow into the shelter, and the straw must be secured by thatch or kept down by poles and wire.



The following sketch shows how a much more simple shelter can be made:—



This also can be extended to any length, and sheaved or loose straw used to cover it. Such an erection could be used as a windbreak to the yards, or could be put up in the various paddocks. By putting a panel here and there the stock would be separated, so that the quarrelsome members of the family could not disturb the others.

## HOUSEHOLD HINTS.

**CANDIED CITRON PEEL.**—Mr. W. J. Allen, the Fruit Expert of New South Wales, furnishes the following recipe in the *New South Wales Agricultural Gazette*:—"Cut the peel into quarters lengthwise, remove the juicy portion, and throw the peel into a salt-and-water brine strong enough to float an egg, and allow it to remain in this for six days. Remove from this and put into clean cold water, and allow to stand for one hour. Then put into a copper preserving-pan with as much fresh cold water as will cover the peels, and let them boil until quite soft. As soon as a silver fork will go easily into them they are, for this stage, boiled enough. Next place them on a sieve to drain them free from the water, and whilst they are draining make a syrup in the proportion of 1lb. of loaf sugar to 1 quart of water. Allow this to boil until it forms a thin syrup, in which boil the peels until they look clear, which will take, probably, about thirty minutes. Some more sugar must now be boiled with only sufficient water for it to absorb. Make just enough of this to merely cover the peels when they are put into it. Again boil them, and continue to boil until the sugar begins to candy. They must then be taken out and again drained. Before they are quite dry lay them out on large dishes, and shake a little very finely-powdered sugar over them. Set the dishes in a warm place for the peels to dry. When dry they may be stored away for use. Be careful to keep stirring constantly while boiling or the sugar will certainly burn. A wooden spoon is the best thing to stir with. For orange or lemon peel I would recommend cutting the peel into halves only.

**UNFERMENTED FRUIT WINE.**—The juice of any kind of fruit can be preserved for any length of time without change or fermentation, and quite easily. Pure unfermented fruit juice is far more wholesome than when fermented. Simply press out the juice (strain it through a flannel bag if it is wanted to be quite clear), place it in bottles, raise the temperature *slowly* to 180° F. by boiling the bottles placed up to their necks in a tank of water over a fire; then close the bottles with corks taken out of boiling water. By heating

the liquor to 180° all fermentive germs are destroyed; by closing up at this temperature no fresh germs can gain access, and without those germs no fermentation or decay can be set up. If the temperature is allowed to rise above 180° the liquor will have a burnt or cooked taste. Some fruit juices will be improved by the addition of a little lemon juice at time of drinking. All juices should be diluted with water, and must be soon used after opening the bottle.

**PILED APPLE PUDDING.**—Place a layer of finely-chopped apples in a buttered pudding dish, add a layer of fine bread crumbs, sprinkle with sugar and spice, with a little butter; then another layer of apples, and continue till filled up with alternate layers as the first two, but finish with bread crumbs at top. Bake slowly till quite brown, and serve while hot. Cream is a good addition when served.

**HOW TO USE DRIED FRUITS.**—First, do not use dried fruits whilst the same kinds can be obtained at fair prices fresh in the market. Dry fruit should first be soaked in a good lot of water for a short time to soften any dirt adhering to it: then wash it, rubbing it between the hands. Rinse it thoroughly, drain off the water. Then cover it with a good lot of water; let it soak twenty-four hours. Take away the water and mix with it half a pound of sugar for each pound of dry fruit. Boil the syrup till clear, then put in the fruit and cook until it is just tender.

**APPLE JELLY.**—Slice the apples without paring; remove wormy and objectionable parts. Stew till soft, with a little water to prevent burning. Place in a jelly bag and drain off all the juice. Measure the juice, boil and skim it well; then add as much granulated sugar by measure as there was of juice. Bring to a rapid boil, and at once pour into the glasses. Red Astrachan apples make excellent jelly.

**SEALING WAX FOR PRESERVES.**—Four pounds white resin, 4ozs. beeswax, 4ozs. shellac, 4ozs. linseed oil. Dissolve over a slow fire; color with 2ozs. Chinese vermilion, and pour into long moulds to form bars.

**SALTED CUCUMBERS.**—Thousands of acres in Russia, Germany, and America are cultivated with cucumbers for salting. The best varieties are chosen, and are cut with about half an inch of stem when they are 4in. or 5in. long. Avoid cutting in the early morning, or when the ground is wet, because dust and dirt may stick to them. Do not cut with anything except clippers, and be especially careful not to move the runner or vine in any way. Be careful not to bruise the "cukes," place them end up in the barrel, three to five rows deep, and pour strongest brine nearly boiling hot over them. Place a small head or disc of wood on top to keep the fruit beneath the brine, and pin it down by aid of a stick, but see to it that no metal of any kind is in contact with the brine. When required for home use, remove the cukes from the brine, wash well, and place in some earthen or wooden vessel, and cover with vinegar for twenty-four hours.

**TOMATO CATSUP.**—Take 1 bush. tomatoes, small kinds by preference, clean off the strigs and any dirt, mash them in the preserving kettle, place over fire, and reduce to pulp; strain the pulp through a hair sieve or fine wire colander to free it from seeds and skins; then boil the pulp down to one-half its original bulk; next add 1oz. ground cloves and  $\frac{1}{2}$ oz. each of ground mace, ginger, and cayenne pepper, and a small teaspoonful of fine salt; mix all together, place on the fire, and boil it two-thirds away, stirring all the time with a long stick; then add  $\frac{1}{2}$  pint best apple vinegar, stir a few minutes longer, remove, and bottle whilst near boiling hot; cork at once, and keep in a cool place. It is a good thing to add 5lbs. finely sliced peeled apples at the first part of the process.

## WEATHER AND CROP REPORTS.

AMYTON.—This district is experiencing another failure of crop. Some farmers will reap seed, but many will not even get as much as that.

BOULEROO CENTRE.—Haymaking is about finished: the average will be half a ton to the acre, or thereabout. The wheat is drying off very fast, and not ripening; crops which a week or more ago promised 5bush. to 6bush. now looked worth only 3bush. On November 17 we experienced one of the fiercest storms ever known in the North.

BOWHILL.—Haymaking is nearly finished, and while some crops go one ton to the acre the average will not exceed 10cwt. Reaping will commence in a few days.

BUTE.—The crops have gone off somewhat during past month, being forced into ear prematurely by the dry, hot weather. Hay crops will be light. Fruit trees generally look well.

CALCA.—The weather during past month has been very dry, only half an inch of rain having fallen. The crops have suffered from the hot weather, and will be lighter than last year. Grass is short, and stock will have a hard time during the summer.

CHERRY GARDENS.—The weather has been very seasonable for haymaking, but too dry for all vegetables. Large numbers of caterpillars are attacking plants of all descriptions. Other insect pests are also numerous.

CRYSTAL BROOK.—The grass and crops are drying and ripening fast. Most of the crops have been cut for hay, the yield generally being very light. Stock are in fair condition. Rainfall for month 0.380in.

GAWLER RIVER.—The hot dry weather has done a great deal of damage, and some crops intended for grain have had to be cut for hay. Owing to strong winds haycarting has been hindered. The wheat is tilling out fast and fairly well, but the grain will probably be pinched a little. Summer crops have also suffered severely, and do not give much promise. Stock are in good condition, but feed is now quite dry, and the milk is falling off. The orchards and vineyards are also showing want of good rain. Rainfall for October 0.600; November to 19th 0.460in.

GERMACHA.—The weather during greater part of the month has been hot and sultry, with small rainfall. Haymaking has commenced; the wheat and oat crops are looking well, and good returns are expected. Grass is showing the effects of dry weather. Late crops of all kinds will be light. Potatoes and fodder crops require a good rain. Milk yield for the district below last year's average. Fruit crops are not so promising as last year. Stock in good condition.

INKERMAN.—Scarcely any rain has fallen since August, and in consequence the promise of a good harvest will not be realised. The early varieties of wheat have given best results this year.

LIPSON.—The weather has been hot and windy, with no rain during month. Crops have suffered considerably, and are ripening off fast. Haymaking is progressing satisfactorily, the average cut being from 15cwt. to 22cwt. Oats and barley crops are fairly good, and some of the wheat on scrubland will go from 8bush. to 10bush., but the average for the district will be about half this. Feed is very short, and the losses amongst sheep from wild dogs and drought have been very heavy.

LUCINDALE.—Since last report rain has fallen on nine days, and the crops are consequently still growing nicely. Shearing is now general, and the clip will be fairly good though showing signs of the severity of the autumn and winter. The fruit crop promises to be heavy. Rainfall for month, 1.025in.

MAITLAND.—The past month has been exceedingly dry, only a very few light showers falling, and hot winds have been very frequent, doing great damage to the crops and gardens. Haymaking is about over. A good acreage having been cut, yield 5cwt. to 10cwt. per acre. Drilled crops still look very fair, filling out well; broadcast very poor, say 2bush. to 3bush. Vines and fruit trees greatly damaged by strong hot winds, and on account of the subsoil having had no soaking for the past three years.

MELROSE.—Haymaking is nearly complete, but the storm on the 19th scattered the stacks, unroofed houses, and did other damage. Rainfall for November, 0.170in.

MOUNT BRYAN EAST.—The wheat crops will be very poor in this district, and in most cases will not return much more than seed. On the best land the crops having blighted off, the tops turning white. The hay crop will also be very light.

MOUNT COMPASS.—Nice growing weather has been experienced during month, and the crops have made good growth. The onions are a failure in many cases, the caterpillars doing great damage to these and other vegetables. Fruit trees look well, and stock are in good condition.

MOUNT PLEASANT.—Stock are in splendid condition, having improved very rapidly. Crops look fair and grass greatly improved.

MUNDOORA.—The present season has been one of the worst known for ripening the wheat crops. Those who have commenced stripping find the straw so dry and brittle that it will not draw into the comb. The grain is small.

**PORT ELLIOT.**—Owing to cool weather in October feed is abundant and still green, and crops are heavy, about twenty tons of hay being stacked from a seven acre paddock in Hindmarsh Valley. The capabilities of the district as regards fruit and vegetables were made manifest by the excellent display at the local show on the 11th.

**QUORN.**—We have had another month of very hot dry weather, and the way the wheat holds out is surprising. What has headed is filling fairly well, though damaged in places. Haymaking is in full swing, the yield being generally light, though in favored spots up to a ton to the acre will be cut. The wheat near Quorn will probably yield from seed up to 8bush. in Richman's Valley, and other favored places; but a few miles east of Quorn they will not get even seed back.

**RIVERTON.**—Owing to the dry weather haymaking has been hurried on. There are many very nice crops round Riverton, and a large quantity of hay will be cut this year.

**SADDLEWORTH.**—Haymaking is general, the recent hot weather causing the crops to come on quickly, the demand for binders and mowers has exceeded the supply. Fair crops over a large area are being cut. The earlier wheats are filling out well. Feed is abundant, and stock of all kinds are in good condition. Local wool clips have realised 6d. to 6½d. per lb. Rainfall for October, 0·770in., an inch below average; for ten months, 14·240in., average (for seventeen years) 17·525. For November to 20th, 0·720in.

## FARM PRODUCE REPORT.

Messrs. A. W. Sandford & Company, report:—

November 30th, 1897.

The month has been dry and disastrous to many districts where a few weeks ago hopes still existed of reaping at least some sort of harvest. Over large tracts in the northern parts of our colony no wheat at all will be gathered, although it is confidently expected by those in the grain trade that at least sufficient will be reaped in South Australia for seed and food requirements, unlike last year, when we had to import considerable quantities from Riverina. Another season's failure must further dishearten farmers in the drier parts of the country, but the difficulty has to be faced, and assistance rendered to keep them on the soil, as this disastrous drought, now in its third year, must surely soon come to an end. Wheat buyers and growers at moment seem to hold different opinions as to the value of the cereal, so that there is very little trade passing, a gap of 4d. to 5d. per bushel existing between buyers' and sellers' ideas.

Flour is about 15s. per ton lower than when we reported last month; on the other hand, however, bran and pollard have improved in price. In a good many districts there is a fair length of growing feed, and as a considerable number of farmers' stock have died, there is not the trade demand at present for hay and chaff, so that quotations in these lines are regulated by local conditions.

Potatoes grown on the plains near Adelaide continue to supply city requirements; values, however, have well sustained. Onions have been in rather fuller supply, so that price of this line is lower.

In wheat, sales have been made at 4s. 11d., but millers' ideas of purchasing are about 4s. 6d. to 4s. 7d. Roller flour worth £12 10s. for export to £13, but lower quotations than this have been made during the last day or two. Bran and pollard have ready sale at 1s. 3½d. Chaff, £4 7s. 6d. to £4 15s. per long ton, bags in, f.o.b., Port Adelaide. Oats, local Algerian, 2s. 3d. to 2s. 5d.; stout New Zealand feed, nominally 3s. 2d. to 3s. 4d. Potatoes, £4 10s. to £5. Onions, £3 10s.

## DAIRY PRODUCE.

The falling off in supply of butter owing to the dry weather, referred to in our last, became very pronounced early in the month through an unseasonably hot spell occurring that lasted about ten days, causing quantities to shorten to within local requirements. The small export trade that was doing in bulk butter ceased, when an advance in local values took place and importations began to come forward from Victoria. A change to cooler weather during the past ten days has, however, again improved supplies somewhat; but with the continuance of the dry season, now seemingly established, this colony must soon begin regularly importing increasing proportions of its requirements in butter. Eggs in the early part of the month steadily firmed in price, but during the past week have again displayed easing tendency; for time of year values here rule high compared with some of the neighboring colonies, and have every prospect of continuing so during coming season. There is no change to report in value of bacon, though business continues active in this line. A considerable proportion of the raw material has still to be imported, rendering it probable that values in bacon will maintain. As we anticipated, the price for cheese has stiffened, and prospects for makers are very favorable indeed for future trade, as stocks for time of year are much below the average. Very good business doing in honey, all marketed finding ready sale. Beeswax also in demand. Although in some lines of poultry during the month values hardly reached as high as in October, rates all round were very

satisfactory, and we again repeat our advice to country people to pay more attention to the raising of eggs and poultry, Westralian increasing demand justifying this.

To-day's market prices are—Factory and creamery fresh butter in prints, from 11d. to 1s. ; private separator and choice dairy, 10d. to 11d. ; well-graded store boxes and medium dairies, 8½d. to 9½d. ; heated stale and inferior, 7½d. to 8½d. ; hen eggs, 9½d. ; duck, 10½d. ; matured New Zealand cheese in cases sell from 9d. to 9½d., duty paid : new local, best quality, 7½d. to 8½d. ; factory sides of bacon, 9½d. to 9¾d. ; farm fitches, well cut and cured, 7½d. to 9d. ; hams scarce at 9d. to 11d. ; clear extracted honey, 3d. ; beeswax, 1s. 1d. ; soft shell almonds, dull at 3d. to 3½d. ; kernels, 5½d. to 6d. In poultry, medium to good hens sell from 1s. 7d. to 2s. each : roosters, 2s. to 2s. 4d. ; extra heavy to 2s. 9d. ; table ducks, 1s. 8d. to 2s. ; prime birds to 2s. 9d. ; pigeons, 6d. to 7d. ; turkeys, 9d. per lb. live weight for medium sorts to 11½d. for fine table birds.

## CENTRAL AGRICULTURAL BUREAU.

MONDAY, NOVEMBER 1.

Present—Mr. F. E. W. H. Krichauff (Chairman). Sir Samuel Davenport. Messrs. Samuel Goode, M. Holtze, H. Kelly, J. Miller, M.P., T. Price, M.P., T. B. Robson, and W. F. Snow.

### Fruit Fly.

The Hon. Secretary Cherry Gardens Branch called attention to following resolution passed at the Conference of Hills Branches on October 19, i.e. :—“ That this Conference of Fruit-growing Branches of the Bureau respectfully request the Central Bureau to take into serious consideration the necessity for taking all necessary precautions to prevent the fruit fly being introduced with fruit from Queensland and New South Wales.”

Members, while agreeing as to the necessity for doing all in their power to keep out this pest, considered that care should be taken not to unduly interfere with importers of fruit. It was decided to ask the Minister to take such precautions as may be considered advisable to prevent the introduction of this pest.

### Donations and Exchanges.

The SECRETARY announced receipt of usual exchanges from various Agricultural Departments ; seeds of *Agropyrum tenerum* from Minister of Agriculture, British Columbia ; and seeds of indigenous fodder plants from Mr. M. Koch, Mount Lyndhurst.

### Letter from Mr. Farrar.

The Chairman read the following extracts from a long letter received from Mr. W. Farrar, of Lambrigg, New South Wales :—

He recommends *Medicago media* as growing in shallower soils than lucern ; also Emerald rye, as he finds stock will get stronger on it than on wheaten or oaten hay : cut directly on coming into ear, it makes attractive hay, and is more succulent than the wiry and hard common rye. If sown early, in March or April, it can be grazed during the winter, and afterwards cut for hay. Horses grazing on rye in winter appear to be as strong and lasting as hay-fed horses, and are sleeker looking. He has raised a wheat by crossing wheat and rye, containing one-quarter of rye blood, which is very productive, looks like wheat, but when the grain is milled the rye blood appears in the dark and peculiar color of the flour. The main objection to this rye-wheat lies in the fact that the grain, if mixed with wheat, would spoil the appearance of the flour. The gluten contents of the rye-wheat, by trial, was 16·1 high ; but the flour strength is low. He calls it “ Ryeland wheat.” It grows much better in winter than wheat, almost as well as rye : but must be sown early.

Mr. GOODE said he would advise great caution in the use of rye-hay. Owing to its very fibrous nature it was injurious to horses. He had lost a valuable horse from feeding it on “ wilted ” rye. Rye as green feed was good, but as hay was dangerous. If used at all for hay it must be cut very green.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

174. *Forests in America.*—The Minister of the Interior of the United States lately said that the forests of the United States originally covered 60 per cent. of the land, but now only a small percentage; and the climate has deteriorated constantly with the deforestation, while the rivers are lower from the sand washed into them, so that the Missouri now can only carry steamers which require 3ft. of water. A report from the Chief Forester of the Department of Agriculture states, as regards the rate of consumption of white pine:—"At last the end is visible, and even the most sanguine can no longer hide the truth that within the next decade we shall witness the practical exhaustion of, this greatest staple of our lumber market. The enormous amounts which have hitherto been cut annually cannot be had beyond the next five or six years, even with Canada to help in eking out our deficiencies. Since 1873 over 200,000,000,000ft. must have been cut, and to sustain the consumption 20,000,000 acres of well-stocked and well-kept pine forest would be required. The consumption of coniferous wood in the United States seems to be something over 460ft. *per capita*, in England one-third of that, in Germany under 150ft., so that it should be possible to considerably reduce our consumption. Our virgin supplies will share the fate of the buffalo unless practical application of rational forestry methods and more economic use of supplies are soon inaugurated. Coniferous wood represents two-thirds to three-fourths of our entire lumber wood consumption, and its reproduction requires more care and longer time than that of hard wood." And in South Australia our Parliament has of late years repeatedly reduced the forest reserves, small as they are, and in the face of probably a considerable rise in the value of timber all over the world!

Mr. SNOW asked whether the timber of *Pinus insignis* grown here was of much value. He had never seen this tree make such vigorous growth anywhere else. The plantation on the Port railway was much admired by visitors, and it was a great shame that it should have been destroyed. Too much planting of trees useless for timber purposes, such as the Tasmanian Blue gum (*Eucalyptus globulus*), was done.

Mr. HOLTZE agreed, but did not consider the Forest Department was to blame. The department was not fairly treated; it was impossible to get much result from timber trees without liberal expenditure for a number of years. A balance-sheet from a Forest Department should not be expected.

Mr. MILLER said a matter of very great importance was the planting of suitable timber on the land from which the Mallee had been cleared. There were immense areas of such country here, and in some cases the soil was drifting owing to the destruction of the timber.

Mr. HOLTZE thought the Tree of Heaven (*Ailanthus glandulosus*) would do well on these worn-out sandy soils.

It was decided to ask the Minister of Agriculture to obtain a report from the Conservator of Forests on the most suitable timber trees to plant in South Australia, with special reference to those suitable for planting in the mallee districts.

175. *Sugar Beet.*—In Omaha, U.S., Messrs. Armour, Fleischmann, Her, and others are erecting the largest factory for beet sugar, which will employ during the season 1,500 persons. The Treasurer of Minnesota, U.S., has imported from Germany 25,000lbs. of sugar-beet seeds, and sells them to farmers at cost price, viz., 6d. per pound; and the Minister of Agriculture for the United States is also going to distribute from 10 tons to 12 tons.

176. *Canned Green Peas.*—Mr. Larsen has, at Green Bay, in Wisconsin, U.S., 1,500 acres under peas. He employs 300 persons in picking and 150 persons for canning during the season.

177. *Tea-growing in South Carolina.*—The Secretary of Agriculture of the United States advocates more extensive planting of tea, as there seems to be a broad zone from the Pacific to the Atlantic Ocean suitable, as shown by the many small plantations lately made. But there is one large tea farm belonging to Dr. C. U. Shepard, at Summerville, S.C., who sold last year 1,100lbs. of the finest tea, and expects fully 2,000lbs. this year. His plants give a better crop than the average of the Chinese, and almost as good a crop as those in India and Ceylon. Importers of tea declare that his tea is equal to imported, and sells readily at about 4s. per pound. It is, however, necessary, unless merely grown for home use, to produce only the finest tea; common tea cannot pay on account of the cost of labor. A factory

to make 50lbs. of dry tea per day will cost from £300 to £400. Every pound of tea requires 10 sq. ft. for spreading to wither the fresh leaves, of which 4½lbs. make 1lb. The curling can be done by hand, but is mostly done by machines. Baron von Mueller always advocated the planting of tea in Victoria, and fresh seeds may perhaps be obtained there, or else from Ceylon, as they lose their power of germination very quickly. I believe that tea can be grown in rich soil in our hills, where there is not too much frost; but, as in South Carolina, it will hardly pay to cultivate it except for home use and by the family.

178. *Spraying of Potatoes*.—Mr. T. C. Stewart, of the Experimental Station of New York, recommends against all the enemies of potatoes no less than seven sprayings with Bordeaux mixture, with the addition of Paris green. Although the worst disease, the late blight or rot blight (*Phytophthora infestans*), appears mostly only every fourth year, it is necessary to spray as a preventive, for if it shows itself spraying is of little use. It is observed first upon the upper side of the leaves, where spots in a white ring appear, made by the small fungus which enters the cells with thread-like growth. These spots soon alter to brown, and later to black, and cause the potato-stalk to die. The spores fall upon the ground, which they enter by means of rains, and thereupon under the skin of the young potatoes, which then become diseased. But in America they have also to fight the early blight (*Macrosporium solani*), which affects the leaves every year, and the crops are more or less injured. The Colorado beetle (*Doryophora decemlineata*) also attacks the potato plants, together with some other insects; hence the necessity for mixing Paris green with the fungicide. The mixture does not injure the leaves. The Bordeaux mixture is an advantage to the potatoes, as proved by experiments, which show the crop to be always a larger one. Where 100galls. per acre were used they were pretty certain of obtaining from 15bush. to 27bush. more than where 50galls. were applied. In 1896, when potatoes generally were fairly free from disease, some sorts gave 16bush. and 28bush. more per acre than where the potatoes were not sprayed; and White Elephant actually gave 60½bush., and Green Mountain 62bush. more.

### Water for Irrigation.

Mr. MILLER asked for opinions of members as to whether it would be profitable to use water for intense culture at 6d. per 1,000galls. He thought himself that it would in suitable localities, but many people said it would not.

Mr. G. QUINN said he had been told by a very large user of water on the Torrens that it would not pay him to pump water where he could get it laid on for 6d. per 1,000galls.

Mr. ROUSON said he believed it cost him more than that price for pumping the water to a height of about 80ft. It was decided to ask those who have been in the habit of using water for irrigation purposes whether it could profitably be used at 6d. per 1,000galls.

### Export of Grapes.

Mr. Thomas Hardy wrote in reference to the damage to grapes exported to England last season. He thought probably there was something wrong in their methods of packing, and suggested that the Minister of Agriculture should be asked to have two or three barrels of Spanish grapes sent out here as an object lesson.

It was pointed out that under the Vine, Fruit, and Vegetable Protection Act and regulations it was illegal to introduce grapes. It was decided to recommend the Minister to carry out Mr. Hardy's suggestion—the grapes to be inspected in quarantine and then destroyed.

### Branch at Terowie.

Several residents at Terowie having signified their desire to form a Branch of the Bureau in that district, it was decided that if ten or twelve suitable men were willing to act as members the Central Bureau would approve of the request.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Carrieton, Mr. J. B. Harrington; Tatiara, Messrs. Thomas Hall and D. Makin; Mylor, Mr. F. Rosser; Port Germain, Mr. E. A. Pavy.

### Reports by Branches.

The SECRETARY reported receipt since previous meeting of thirty-six reports of Branch meetings.

MONDAY, NOVEMBER 22.

Present—Messrs. F. E. H. W. Krichauff (Chairman), S. Goode, W. C. Grasby, Thomas Hardy, H. Kelly, T. B. Robson, and A. Molineux (Secretary).

### Finance.

The Finance Committee reported expenditure to date for contingencies, £294 10s. 4d. Accounts to the amount of £138 7s. 5d. were passed for payment.

### Irrigation.

Mr. HARDY referred to inquiry as to cost of water for irrigation purposes. He did not believe it would pay to give 6d. per 1,000 galls when a good supply can be obtained at a shallow depth. A neighbor of his was using an oil-engine for pumping, and a very careful test showed that the cost for oil was not more than  $\frac{3}{4}$ d. per 1,000 galls., and he was quite sure another penny would more than cover wear and tear. Mr. Goode agreed that where water can be obtained at 15ft. to 20ft., and the well and pump is already fixed, it would pay better to pump it than to pay 6d. per 1,000 galls. for water from the mains.

### Donations and Exchanges.

The SECRETARY announced receipt of usual exchanges from kindred institutions, and plants of milkbush (*Sarcostemma australe*) from the West Australian Bureau of Agriculture.

### Potato Cultivation.

The CHAIRMAN read the following report on trials with potatoes presented to the Secretary by Mr. T. W. Kirk, F.L.S., of New Zealand Department of Agriculture:—

The potatoes were planted on August 3, at Norwood, on high, rather loose soil, there being one tuber only of each variety, except Sutton's Maincrop, Kidney, and Vicar, of which there were two. The soil received a fair dressing of rotten cowdung twelve months previously, and in March some Thomas phosphate and muriate of potash. The tubers were all large, 3oz. to 4oz.; but, being late, it was not advisable to cut them. The plants were well hoed when about 6in. high, but the extreme dryness caused them to ripen off prematurely, some after only eleven weeks' growth. All the tubers were sound, with smooth skins, but the later varieties produced a number of very small tubers. Beauty of Hebron and the Vicar did best, Jubilee next, then Early Rose. The following were the varieties tested:—Ashton's Seedling, a reddish blue round potato, 11 tubers of fair size; Beauty of Hebron, round or oblong, light pink, 21 large, 20 smaller tubers, fairly early; Bruce, flesh light yellow, 5 fair, 30 small, late; Canadian, light pink, round, 11 fair, 6 small; Carter's Holborn Reliance, white, round, 11 good, 6 small; Carter's Surprise, egg-shaped, white, 11 good, 13 small; Derwent, light blue, round, 13 good, 8 small, late; Early Rose, oblong rose, 3 as large as the seed, 13 good, 6 small; Early Puritan, somewhat round, white, 3 as large as seed, 8 good, 10 small, early; Grampian, round, reddish, 3 as large as seed, 4 good, 7 small, and lot of smallest; Imperator, round, white, 16 very good, 2 small, nice potato; Jubilee, round, yellowish, 15 good, 11 fair, 5 small; Magnum Bonum, oblong, white, 11 good, 8 fair, lot of small; Peach Blow, round, with deep pink eyes, 6 fair, 9 small, 12 still smaller; Tukreta, oblong, white, 2 as large as seed, 7 fair, 5 small; Superior, oblong, pink, 3 as large as seed, 5 fair, 6 small, a nice potato; Sutton's Early Regent, round, white, 7 middle size, seemed to die off earliest; Sutton's Maincrop Kidney, oblong, white, one plant produced 4 good, 7 fair, and some small; the other, 5 good, 10 fair, 10 small; The Vicar, late, blue-black, round, one plant gave 2 as large as seed, 9 good, 10 small; the other gave 3 good, 15 fair, 6 small, and a lot smallest—suffered from drought; White Elephant, oblong, white, 4 fair, 6 small, and lot smallest.

The CHAIRMAN said he would like to hear from practical growers the best means of keeping the seed potatoes from season to season. In many cases he



knew the growers obtained a change of seed each year from an earlier or later district; but this was not satisfactory when dealing with new varieties. Mr. Robson said it was a most difficult matter to keep any but the slow maturing varieties. These could be kept in good condition by packing in dry sand and storing in a cool place. He found it better, however, to obtain his seed from the Hills district.

The SECRETARY was instructed to ask the members of the Hills Branches for information on this subject.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

179. *Reports on Aboul.*—Herr Caron states, in the *Hanoverian Agricultural Courier* of September 4th, that he found a difference like 100 to 140 where he used his nitrogen bacillus (Ellenbachensis alpha) for cereals, as well in pots as in the field. Phials containing 1½ gr. can be obtained from Beyer & Co, in Elberfeld, sufficient for half an acre. The bacillus cultures are in gelatine, which is dissolved in a larger quantity of water of the usual temperature of a room, poured on the wheat or other seed, and, after stirring, sown. Professor Dr. Edler, of Jena, also reports that experiments made by other persons are, on the whole, quite as satisfactory as those made by Mr. Caron, and is pleased to see the action of the Government of Prussia to have this question of so much practical importance quickly and thoroughly inquired into at all the Experimental Stations.

180. *Thomas Phosphate and Superphosphate.*—You may apply these to the same land, but not at the same time, a fortnight at least should intervene between the spreading of superphosphate where Thomas phosphate has been used. The lime in the Thomas phosphate (said to contain 1,120 lb. of it in a ton) would make the phosphoric acid (which is soluble in water) in the superphosphate quite insoluble. It, therefore, becomes unfit for the nourishment of plants if the two were applied simultaneously, and before the Thomas phosphate has time to act, making other combinations in the soil.

181. *Late Sowing and Manuring.* We do not make the difference between winter and summer wheat, as is done in Europe; but the remarks made by Mons. J. Grandeau on their respective requirements are most interesting. They seem to me of value, where many of our farmers sow part at least of their crops very late, and thus shorten the period of vegetation. The poor state of the winter crops in France induced him on March 2nd, 1897, to advise farmers not only to grow summer wheat extensively, but also to lay particular stress on the necessity to feed it well. He says in the *Revue Agronomique du Temps*:—"The mineral manures which are suitable for the soils and crops permit us, at small expense, to give to poor crops of wheat and rye a vigor which cannot be attained without such help. He then recommends of summer wheats *Ricelle de Grignon*, *Beardless Odessa*, *Summer Chiddam*, and *Summer Saumur* for the northern parts of France; and says that these varieties have for forty years, after abundant manuring, always given from 25 hectolitres to 30 hectolitres of grain (of 22 galls. each). And that is not the maximum crop from an hectare (2½ acres). The summer wheats go through the phase of vegetation, according to climatic conditions, in a period varying from 90 to 150 days (as a mean say 125 days); while the winter wheats accomplish it between 270 and 350 days (or as a mean in 290 days). [Here the early-sown wheat may grow about 240 days; the later-sown from 150 to 180 days.—CH. AGL. B.] To be able to develop and to produce 2,000 lb. of grain, winter wheat will take from the soil 41 lb. nitrogen, nearly 16 lb. phosphoric acid, and 10½ lb. of potash; and for 2,000 lb. of straw, 9½ lb. of nitrogen, 4½ lb. of phosphoric acid, and nearly 12½ lb. of potash. Summer wheat, however, will require for 2,000 lb. of grain, the same quantity of nitrogen, but 18 lb. of phosphoric acid and 11½ lb. of potash; and for 2,000 lb. of straw, 11½ lb. of nitrogen, 4 lb. of phosphoric acid, and 22 lb. potash. The greatest difference is, therefore, in the potash for the straw. But the winter wheat required also daily 27 gr. of phosphoric acid during the 290 days of growth; while the summer wheat during its vegetation of 125 days required nearly three times as much, viz., 73 gr. per day. Unless the summer wheat [or, as I take it, the later-sown wheat.—CH. AGL. B.] is put, therefore, on better manured soil, the crop cannot equal that from winter wheat [or early-sown wheat.—CH. AGL. B.]. The large quantity of potash found in the straw of summer wheat is also worthy of consideration. The physiologic activity of a plant is proportionate to the development of its leaves. They are the organs which elaborate the live matter, the seat of hyrocarbonic matter, sugar, starch, cellulose, of which the two first slowly emigrate from them to constitute the organs of reproduction—the grain. It is also said that the formation of starch in the leaves is under the influence of the chlorophyll intimately connected with the presence of potash. It seems, therefore, probable that the considerable quantity of potash in the straw of the summer wheat is an

indication of the great activity which is necessary for the plant in the relatively short time which elapses between germination and fructification compared with winter wheat. As before stated, the summer (or late-sown) wheat requires an abundance of easily-reached nutritive elements, and the same applies to the cultivation of oats, barley, buckwheat, rye, and maize, if they are to ripen in a comparatively short space of time. In accordance with the climate of the locality, the period of vegetation for oats is from 88 to 150 days, say 120 days; long-eared barley, from 92 to 168 days, 122 days; maize, from 70 to 183 days, say 140 days; buckwheat, in the west of France, 90 to 100 days. How much manure is to be applied depends on the state of fertility of the soil; but Grandaun gives by the following an idea what is taken from the soil by 200lb. of grain and straw:—

	Nitrogen. Kilos.	Pho-sphoric Acid. Kilos.	Potash. Kilos.
Summer wheat.....	3.56	1.44	3.52
Oats.....	3.02	1.31	4.16
Barley.....	2.50	1.05	1.97
Maize.....	4.38	2.75	9.88
Buckwheat.....	3.21	1.39	3.54

As regards France, he states that, with rare exceptions, exceedingly good crops of grain are obtained, if phosphates and nitrates are used, potash being there usually in sufficient quantity in the soil.—[The same as regards potash has been repeatedly stated by Professor Lowrie as regards those parts of South Australia that are known to him.—(H. AGL. B.) 200lb. of nitrate of soda per hectare (2½ acres) produce about 3-cwt. more of wheat, 5-cwt. more of oats or barley, provided sufficient unlocked phosphoric acid and potash is present. He recommends, per acre, the following quantities of manure—(1) on soil poor in lime, for wheat, oats, barley, and buckwheat, 200lb. of Thomas phosphate, 80lb. to 120lb. of nitrate of soda, and 160lb. of muriate of potash (or 480lb. of kainit); if the soil is poor in potash (2) On limy soils, 120lb. of Thomas phosphate, or 120lb. of superphosphate, and the same quantities of nitrate of soda and potash, if necessary, which are before mentioned. He spreads the above at the working of the soil previous to sowing, with, perhaps, only half or less of the nitrate intended to be used, and in that case he uses the rest towards the time the crop is going into ears. If, however, the leaves show a want of vigor, or are getting yellow, in that case, and also for winter wheats, which have suffered from cold or wet, a top dressing of 80lb. is perhaps necessary. For maize, double the quantities of nitrate and Thomas phosphate, and more potash may be given with advantage.

### Spraying Experiments.

Mr. HARDY said he had visited Mr. Quick's garden at Marion, and was well pleased with the thorough way in which Mr. George Quinn was carrying out his spraying experiments for suppression of codlin moth. Not only were different poisons being used, but different blocks of trees were being treated at different intervals, and some were left untreated, to check results. If the experiments were continued in as thorough a manner as they had been begun, there could be no doubt that the efficacy of arsenical sprays would be thoroughly tested. He would, however, call attention to the necessity for great care being taken in the use of arsenate of lime. Unless it was colored in some way it might possibly be taken for flour or baking-powder, as has often been the case, if inadvertently left about. He thought the Bureau might suggest to chemists the advisableness of coloring the stuff. Messrs. Grasby and Robson supported Mr. Hardy's statement as to the thorough way in which the spraying tests at Marion were being carried out, and the former suggested the use of common washing blue as a harmless, cheap, and effective coloring for arsenate of lime.

### Branch at Koolunga.

The formation of a Branch at Koolunga, in place of the Yacka Branch, was approved with the following gentlemen as members:—Messrs. E. J. Shipway, J.P., R. Palmer, jun., J.P., J. Button, Jno. Butterfield, T. B. Butcher, W. T. Cooper, R. Jackson, J. Freeman, J. Sandow, J. Jones, W. Ballinger, R. H. Buchanan, E. W. Lillecrapp, Alex. Craig, and G. Pennyfield.

### Effect of Feed on Quality of Milk.

The Secretary of the Dairy Board forwarded inquiry from Mr. J. L. Thompson, of New South Wales Department of Agriculture, as to whether

the feeding of rich foods to milch cows had the effect of increasing the percentage of butter fat in milk. The Dairy Board suggested the inquiry should be referred to the Branch Bureaus.

Members were of opinion that it would be useless referring this matter to the Branches, as, owing to the entire absence of any tests in this colony, opinions only, and not actual results, could be furnished. They thought the question had been satisfactorily settled by the very elaborate tests carried out in the United States and Germany, where the conclusions arrived at was that while feeding rich food to milch cows increased the flow of milk of the same richness as when fed upon poorer food, the actual percentage of butter fat was not increased.

### **Stock Quarantine Expenses.**

The SECRETARY reported that at a meeting of the Port Elliot Branch, held on October 30, the following resolution was passed:—"This Branch is of opinion that to encourage private enterprise in the importation of livestock, part of the cost of quarantine should be borne by the Government."

Members were of opinion that as this was a matter affecting the revenue of the colony, it should not be discussed by the Central Bureau, but that those interested should get their representatives to bring the matter before Parliament.

### **New Members.**

The following gentlemen were approved as members of the undermentioned Branches:—Finniss, Mr. P. Gooding; Calca, Mr. J. Bowman; Hartley, Mr. W. Stanton; Bute, Mr. M. Hall; Mount Remarkable, Mr. H. B. Ewens; Holder, Mr. W. J. Green; Amyton, Mr. W. A. Willshire.

### **Reports by Branches.**

The SECRETARY reported receipt since previous meeting of thirty-four reports of Branch meetings.

## **REPORTS BY BRANCHES.**

### **Morgan, October 9.**

Present—Messrs A. Stubing (in chair), R. Windebank, T. T. Schell, E. French, G. Roediger, and J. Wishart (Hon. Sec.).

**COOL CARRIAGE OF PRODUCE.**—Reference was made to the poor prices obtained for butter sent to Adelaide during the summer months, caused by deterioration during transit. Large quantities of rabbits and fish are also forwarded from this station, but these also are greatly injured before reaching town. It was decided to ask the Minister to urge on the Railways Commissioner the advisableness of extending the running of the refrigerating car to Morgan.

**WHEAT EXPERIMENTS.**—Mr. Roediger reported that his Dart's Imperial wheat promised well, and appeared to be a good variety.

### **Carrieton, October 28.**

Present—Messrs. W. J. Gleeson (Chairman), W. H. Byerlee, G. Martin, J. McNamara, and J. W. Bock (Hon. Sec.).

**FORESTRY.**—Some discussion took place on the question of the establishment of a forest reserve in this district.

**CATERPILLAR PESTS.**—Several members reported prevalence of immense numbers of caterpillars attacking tomatoes and melons.

**Swan Reach, October 7.**

Present—Messrs. P. A. Haase (Chairman), J. O. J. Kohnke, J. L. Baker, J. D. Scott, R. Harris, F. Fischer, B. Schwartz, A. G. Zadow, G. N. Lemke, P. A. Beck (Hon. Sec.), and one visitor.

**WHEAT-GROWING.**—An interesting discussion on wheat-growing took place. Members favored Purple Straw wheat in preference to Steinwedel, the latter being only suitable in a wet season. It was reported that the crops on new mallee land had gone off badly owing to drought.

**Mount Remarkable, November 3.**

Present—Messrs. A. Mitchell (Chairman), A. Pope, W. Girdham, W. Lange, S. Challenger, C. E. Jorgensen, T. P. Yates, T. H. Caseley (Hon. Sec.), and one visitor.

**DISC-HEADER AND THRASHER WITH TWINE-BINDER.**—Mr. Jorgensen read a paper upon this subject. He believed there was no country in the world where the seasons were so variable as in this colony. Hence there was urgent necessity to provide stores of food for live stock; but he thought that there is no part of the globe where people are so careless about making such provision as in South Australia. And yet they have every advantage for doing so. No farmer should be without a twine-binder, which, with proper attention, will cut and bind from 10 acres to 12 acres per day, at a cost for twine of about 1s. per acre. The wheat should be cut when just turning yellow, about ten or twelve days before the stripper could safely enter. This enables the farmer to secure the bulk of his crop before the heavy winds occur—they always occur at harvest-time—and which causes such great losses when the grain is fully ripe, sometimes as much as 2bush. or 3bush. per acre. If farmers depend entirely upon the stripper, they are not only subject to this loss, but they are at times delayed by damp weather, crops get knocked down, men kept idle, unable to work the stripper, whilst the binder could be at work all the time. All the straw is thus saved, and can be used as fodder in times of scarcity; also for thatching. The twine can be utilised in thatching, and for the manufacture of ropes. By starting harvest ten or twelve days earlier, there is so much less for the stripper—by say 120 acres—and we have about 120 tons straw to the good, which will save cutting so much hay, and the harvest will be over all the earlier. The disc-header will take the grain out of the sheaves with no damage to the seed, which will do for sowing. Two horses will work the header more steadily than one. With a sheaf-carrier attached the straw can be stacked at the same time. Lay down a tarpaulin to catch the grain. A winnower can be attached to the gearing, so that the grain can be cleaned and bagged at once. He considered that the saving of grain upon the whole farm, by use of the binder and disc-header, would more than repay the cost of the machinery, to say nothing about the straw, which he valued at £1 per ton.

**Forest Range, November 4.**

Present—Messrs. J. Vickers (Chairman), J. Sharpe, H. Waters, G. Monks, A. Green, J. Green, H. Caldicott, C. Stafford, J. G. Rogers, R. M. Hackett (Hon. Sec.), and five visitors.

**RASPBERRY CULTIVATION.**—Mr. Monks read a paper on this subject, of which the following is the substance:—

Raspberries belong to the soft fruits, and require more care in cultivation, in selection of soil, situation, and shelter than apples, plums, pears, &c.

*Situation.*—A first-class situation would be a slope towards the south, not too steep to be properly workable by hand or by horse-power, with belts of timber on the east, west, and north sides, with either a hill or a belt of timber on the south, although this is not so necessary as shelter from the other points. The next best situation would be a slope towards the east, with belts of timber east, west, and north. The prevailing idea should always be to keep the afternoon sun off entirely if possible, as the sun always seems to scorch the fruit more in the afternoon than in the morning, and the shelter in the directions indicated are necessary to protect from winds and frosts.

*Soil.*—A rich chocolate or brown soil is the best, although the canes do exceedingly well on black soil, and in good seasons produce abundant crops: yet this kind of soil seems more susceptible to frosts, or, at all events, the raspberries grown thereon seem to be cut more; but it may be on account of the lower ground.

*Preparation.*—Having selected a suitable site and soil, break up the ground carefully and finely to a depth of not less than 18 in.; bury all small sticks, bark, leaves, and, in fact, all vegetable matter, or any other manure possible. Then plant stout, sturdy canes in rows not less than 4 ft. each way, and never less than from eight to ten canes to the stool, because by planting this number instead of four or five, your raspberry bed will be in full bearing one or two years sooner; and this is a most important point, it being better to plant half an acre with say ten canes to each stool than an acre with only five to the bunch. Now, with reference to working the ground, or cultivation proper, I unhesitatingly give it as my opinion that the spade should never be used among them for this purpose; and what is called skim-digging should never be indulged in, as this kind of digging is not worth the name, as the sod is simply turned over, the soil is not pulverised, but stays in lumps just as it was cut, and the air gets all through, and in the summer the land is as dry as a bone, no moisture being retained. For cultivating, I prefer the fork to the so-called drag, as it is light and easy to work, and you can get the lines between the canes in the stools to clean out the weeds; and you need not be afraid to send it into the ground either, for it will not do damage but good; that is more than can be said of the spade, as it would be almost, if not quite, fatal to the raspberry canes to do so with that tool. As they want at least one deep cultivation per year in order that sufficient moisture be retained in the soil, a fork must be best for this purpose; and later on the use of the hoe would be necessary, making two cultivations per year, which is none too much, three being much better—say, dig in early part of June, light hoeing in end of October, and work again after the fruit is picked, as it is almost impossible to work the ground too much if enough moisture is to be retained. I will just here quote one or two authorities as given by Dr. Chase:—“Shallow culture will not do for raspberries, as the roots require coolness and moisture. Without these conditions, in dry seasons the crop will not perfect itself. They should be well hoed and kept clean from weeds the two first seasons after setting; after that a very good and easy way of tending them is to cover the surface between the stools, or vines, with some kind of coarse litter (straw or marsh hay is first-rate) to a depth of 5 in. or 6 in. That will prevent the weeds from growing, and keep the ground cool and moist.”

*Manuring.*—I think a little suitable manure should be added at least every other year, if not every year. Of course it is necessary to study the soil somewhat so as to know what kind of manure to use, but bonedust with the weeds and greenstuff will generally be found suitable. If possible, everything that grows among the canes—for instance, the old canes and suckers, &c.—should be buried as manure, and also to keep the land loose. If, however, it is not possible to bury the old canes, they should be burned alongside, and the ashes returned to the ground. The young canes, or rather suckers, should never, unless they are wanted for planting new beds, be allowed to grow among the parent canes, as they draw too much strength and moisture from them.

*Pruning.*—I have tried all manner of ways to see which is the best to treat the canes, such as letting them grow as they please, tying them with a string in a bunch (the whole stools together), twisting the stools in three and four bunches, arching one set with another; but pruning is the only way that has proved anything like a success, and this year I have cut them all down to about 3 ft. from the ground. I get better quality and larger fruit, and quite as much in bulk; and another great advantage is, the fruit is much more easily picked. You can get about better around them, and it has a tendency to make the canes become more sturdy. Dr. Chase, in reference to pruning raspberries, says:—“Those that understand the cultivation of the raspberry consider it the best way to pinch off when 3 ft. or 4 ft. high, according to the richness of the soil, else to cut back as soon as they reach 5 ft. or 6 ft. high, which certainly tends to make them more stocky, and to produce much stronger lateral or side branches, which should also be pinched off or cut back to insure a larger berry and a larger yield of fruit.” When removing old canes from the stools, never cut but break them, because by cutting you cannot remove them close enough to the ground without danger of injuring the new canes; and if they are not

taken out very low down, in time your canes will be growing on top of the soil instead of under or in the soil, and old stumps when cut play up with the fingers when cleaning out the weeds. All weakly canes should be cut out also, it being better to have only a few sturdy ones than a lot of puny canes in the stools.

*General Notes.*—It is no use trying to cultivate raspberry canes in land too wet. Plenty of moisture is needed, but they will not live in land and water together, particularly if too much of the latter is present; therefore the land in that case must be properly drained. So far only new raspberry beds have been dealt with; perhaps a few words will not be out of place with reference to old ones. I notice that canes which flourished some few years ago, before the natural shelter was cut away, are now in a very poor condition, which shows unmistakably that growers cannot be too careful how they destroy such shelter. I think, however, that if the ground were broken up amongst them to a depth of 14in. or 15in. with the prong-hoe or drag, and all the weeds and rubbish cleaned out of the stools so that the roots could have free play, adding at the same time plenty of manure, it would put new life into them, and make them almost like young canes; for no doubt, to a certain extent, they are root-bound. I think if the ground were worked up to a good depth always, it would have the effect of decreasing the power of frosts. In conclusion, if any degree of success is to be obtained with raspberry culture, it must be borne in mind that only so many canes should be planted as can be properly attended to. A small bed well cared for will produce more fruit than a large one half attended to.

Mr. J. Green agreed as to aspect of beds, but considered four canes sufficient; he had found he got less canes the following year when more canes were set. He preferred dark soil, and considered manuring unnecessary as long as the canes keep from 4ft. to 5ft. high. He would advocate scarifying in the autumn, and digging in spring. He noticed the "Fillbasket," if pinched back while growing, sent out better laterals. Mr. J. Green considered a slope to the east the best position, and ten canes too many for planting; he strongly favored mulching. Mr. H. Waters favored digging with the fork, and mulching with seaweed was beneficial owing partly to the salt it contained. Different varieties seem to do better in different soils; he had known raspberries do well on black sand. The second growth after later rains is no good, and is responsible for the tops dying back. Mr. F. Green had tried pruning when the canes were 3ft. to 3ft. 6in. long, and they made another foot of growth; "Fillbaskets" made two or three heads, and the canes become stiffer; some, pruned later on in the season, did not shoot, but made laterals right from the ground. He did not believe in nipping back the laterals. Mr. Rogers had got double the growth as a result of pinching out the tops; he strongly favored mulching. Mr. H. Green also favored mulching; considered black soil the best, but as it generally lays low the canes get cut by frost. Pruning would result in reducing the number of canes in the stool, or they would smother one another. Mr. Vickers said raspberries did not want the sun on them to ripen or color them; the best fruit was grown on low ground. He had tried every system of pruning he knew of, and had come to the conclusion, after years of experience, that the best plan was to let the plants grow naturally, selecting shady places if possible. The question of soil was not of so much importance as the aspect. He considered the scarifier unsuitable for cultivation, as it drags the roots; deep digging between the rows, and shallow round the canes, was best. The more the soil was worked in the summer the better. He considered superphosphate better than bonedust as a manure; he could notice the beneficial effects of the manure for three years. In reply to questions, Mr. Monks said he never planted less than eight canes, or more than ten to the stool, and considered he got them in full bearing earlier than if only four or five canes are planted. Manuring was not advisable until the beds showed signs of wanting it. In comparison with other crops, raspberries took but little out of the soil, as the old canes and growth went back. He had used 8cwt. of bonedust per acre, thrown round the stools and not dug it. In regard to frost, there was no doubt they must do something, either by planting hedges or making smoke fires to protect the plants.

**Port Pirie, November 2.**

Present—Messrs. G. Robertson (in chair), E. Stephen, T. Gambrell, R. F. Humphris, J. Lawrie, W. Smith, H. B. Welch, G. Hannan, and G. M. Wright (Hon. Sec.).

**FIELD TRIAL SOCIETY.**—The Secretary of the Field Trial Society intimated that the proposed field-trial of harvesting machinery had fallen through, owing to lack of entries, due to importers being out of stock. It was decided to suggest holding a trial of cultivating implements and seed and manure drills about the end of March.

**Lyrup, November 2.**

Present—Messrs. T. Nolan (in chair), F. E. Chick, E. Layton, A. Thornett, D. J. Bennett, W. H. Wilson (Hon. Sec.), and one visitor.

**WHEAT.**—Mr. Bennett tabled sample of Dart's Imperial Wheat, over 5ft. in height, grown by irrigating. Mr. Thornett considered this a good hay wheat, as it was heavily flagged and strong strawed. Members generally were of opinion that immature seed should not be sown except the crop is to be cut for hay. Mr. Nolan reported that the wheatcrop on the Settlement was very patchy; that on good hard limestone country was very good, but on other classes of soil it was poor.

**INSECT POWDER PLANT.**—Mr. Chick reported having plants of *Pyrethrum cinerariæfolium* 2ft. 6in. high, and flowering freely.

**Pyap, October 29.**

Present—Messrs. K. F. Huselius (Chairman), T. Teale, B. T. H. Cox, E. Robinson, A. J. Brocklehurst, C. Billett, and W. C. Rogers (Hon. Sec.)

**POTATO DISEASE.**—It was reported that plants of Regent potatoes were dying off before maturing. Mr. Brocklehurst stated the plants were well attended to, and he failed to find any cause for the trouble. The tubers were plentiful but very small, and he was disposed to attribute it to using old or poor seed. [A disease called "Early Blight" causes the tops to go off before the tubers mature; probably this is what is wrong here. The best preventive action is frequent change of seed, and spraying the plants with Bordeaux mixture early in their growth. If left until the disease appears nothing can be done.—GEN. SEC.]

**SEED AND MANURE DRILLS.**—A discussion took place on drilling wheat in with fertilisers, the members generally being of opinion that such practice would prove profitable in this district. It was decided to recommend the Pyap Village Association to purchase a drill before next sowing season.

**FRUIT PESTS.**—Members favored the establishment of Fruit Boards, as advocated by the Tanunda Branch, and also thought that something should be done to prevent the distribution of infected stock from the nurseries. Several members reported some disease amongst their vines, causing the shoots to drop off, and the vines to bleed profusely.

**Holder, October 29.**

Present—Messrs. F. A. Grant (Chairman), F. Rogers, F. Slater, J. O'Connell, P. J. Brougham, E. Crocker, J. J. Odgers (Hon. Sec.), and two visitors.

**SEED EXPERIMENTS.**—Members reported as follows:—Black maize 6in. to 8in. high, and doing well; peas growing splendidly; broad-leaf mustard very luxuriant, some plants being about 8ft. high; ball-head cabbage, splendid specimen tabled.

### Kapunda, November 6.

Present.—Messrs. H. King (Chairman), Pat. Kerin, G. Harris, Peter Kerin, and T. Jeffs (Hon. Sec.).

**CONFERENCE.**—Resolved to hold a Conference of Kapunda and surrounding Branches during March next. Hon. Sec. to arrange.

**MEETINGS.**—Owing to harvest, &c., resolved to forego meetings in December and January.

### Bute, November 2.

Present.—Messrs. A. Schroeter (Chairman), H. Schroeter, W. Langsford, R. Fulwood, E. Ebsary, J. H. Barnes, R. C. Commons, J. J. Chapman, S. Lamshed, D. Green (Hon. Sec.), and one visitor.

**"INCHWORMS."**—Mr. Barnes reported two kinds of caterpillars attacking his fruit trees, particularly the apricots. They have a peculiar method of progression from tail to head. [These are variously called "Inchworms," "Loopers," "Palmer worms," "Measuring worms," &c. They are abundant all over South Australia this year, and attack all kinds of plants. They eat the fruit, leaves, and young shoots, therefore can be poisoned with Paris green, arsenate of lime, or other *insoluble* preparation of arsenic. One ounce of Paris green mixed with 6lbs. flour, applied with a sulphur bellows whilst the plants are damp in early morning; or spray Paris green as recommended for codlin moth caterpillars.—GEN. SEC.]

**WILD MUSTARD**—Mr. A. Schroeter reported wild mustard or charlock to be prevalent around Barunga district and Snowtown, and that one farmer believed his crops to have been reduced £200 in value through its presence. Members are of opinion that this ought to be brought under the Noxious Weeds Act. [Every colonist should endeavor to destroy such weeds on sight, before they flower or produce seed. Sow perfectly clean seed. Our Statute-books are loaded with Acts and Regulations which are inoperative, because those who are most deeply interested take no steps to enforce them, and many actually obstruct the enforcement with all their power.—GEN. SEC.]

**EXPERIMENTAL SEEDS.**—Mr. Fulwood reported good results from Iceberg lettuce seed sent by Central Bureau. [Save seeds for further distribution.—GEN. SEC.]

**MANURES.**—Members wish to know if it would be right to mix muriate of potash with English superphosphate for wheat crops. [No. Be always careful to avoid mixing alkaline and acidulous manures. They may be applied separately with an interval of say one month, after the first of either manures has been harrowed or scarified into the soil.—GEN. SEC.] Mr. Lamshed reported that Mr. March had excellent results in a wheat crop through dressing the land with freshly slacked lime.

### Nantawarra, November 9.

Present.—Messrs. C. Belling (in chair), E. J. Herbert, A. Herbert, R. Uppill, and T. Dixon (Hon. Sec.).

**DESTRUCTIVE BEETLES.**—Hon. Secretary produced some beetles which are destroying fruit on apricot trees, also foliage and vine leaves.

**FAT LAMBS.**—Mr. C. Belling said he had topped the market in Adelaide with Southdown-Merino cross.



**CROPS AND WEATHER.**—Rainfall for October 0.580in. Drying winds have parched up the crops to a great extent. Haymaking is general, and will average about half a ton to the acre. All sorts of live stock are fat and thriving well.

### Meadows, November 1.

Present—Messrs. J. Catt (Chairman), W. Pearson, T. B. Brooks, W. J. Stone, G. Usher, T. Usher, H. V. Wade, and W. A. Sunman (Hon. Sec.).

**BUDDING.**—Members wished to know the exact meaning of stock-budding. [The stock is the tree or plant upon which the bud is placed.—GEN. SEC.]

**SPAYING COWS.**—In order to test practically whether it is profitable to have milch cows spayed, the members had eleven cows operated on. Of these one has unfortunately died, but the others are doing well.

### Onetree Hill, November 5.

Present—Messrs. J. Bowman (Chairman), F. Bowman, G. Bowman, F. L. Ifould, W. Kelly, E. A. Kelly, A. Thomas, and J. Clucas (Hon. Sec.).

**CABBAGE MOTIL.**—Mr. W. Kelly reported that great numbers of caterpillars of a small moth were attacking cabbages, turnips, &c. [These are most probably the larvæ of *Plutella cruciferarum*, which make the cabbage leaves as full of holes as the bottom of a colander. They can be prevented doing any damage by thoroughly spraying the plants with tar water, made by pouring drop by drop, eight ounces coal tar into four gallons boiling water, stirring violently all the time until all is dissolved; then pour the solution into forty gallons water, and use it as required.—GEN. SEC.]

**EXPERIMENTS.**—Several members reported upon seeds tried. [No particulars given.—GEN. SEC.]

**CROPS.**—Some crops amongst the hills are looking remarkably well. Some are dirty, especially those on fallowed land, where the weeds did not germinate until after the crops were sown.

**FENCING.**—Mr. E. A. Kelly read a short paper on this subject. The following is the substance:—

Good substantial fences are most economical. The posts should be from matured trees. Very old trees are liable to be worm-eaten and fragile, while posts from young trees are not strong. Scrub gum is durable, strong, and resists the termites, or "white ants." Red gum is also very good, but short in the grain. Blue gum is tough and strong, being very useful for stockyards, &c., but is liable to be attacked by termites. He thought fences were generally too high, as stock were more likely to get through than over them. Posts 5ft. 8in. long, with 20in. to 24in. in the ground, 9ft. apart, with five wires, the top one barbed, would make an excellent fence. Good strainers are most important. They should be strutted securely with at least 7ft. struts. The best fence is where all the posts are of wood, 9ft. apart. The foot of each post should be banked around and well rammed, to keep the wet out of the post-hole. The barbed wire should be run through the posts (horse-power may be used), and strained in the usual way. No. 8 steel wire, barbed, 14-gauge, barbs 3in. apart, may be used. Such a fence would cost £48 per mile. A neat, serviceable fence, with posts 14ft. apart, and intermediate drops costing 4d. each, could be put up for about £40 per mile. The drops are of 5-16ths round iron, fastened with galvanized clips and nails. Still cheaper fences could be erected, by using fewer wooden posts and more iron standards, but he would not recommend more than one standard for each post, except on very level country. Suspended gates are necessary across creeks. A rope made with four strands of fencing wire should be drawn tight between two well-secured posts on either side of the creek, and as many floodgates as necessary suspended therefrom. By using the latest improved strainer a strain of 200yds. is possible. A fence, with posts 8yds. apart, with five droppers between posts, would cost £25 per mile. No. 8 steel wire cost 9s. 6d. per cwt. of 500yds. Barbed wire, 14 x 3, 700yds. to cwt., cost 13s. 5d. Iron standards, 4ft. 6in. to 5ft., with five holes, £10 per ton, or about 4d. each.—640 to the ton.

**Hartley, November 11.**

Present—Messrs. C. Harvey (Chairman), W. Klenke, W. Kutzer, A. Dalton, G. Jaensch, H. Reimers, A. Wundersitz, J. Ferries, A. Thiele, J. B. Sanders (Hon. Sec.), and two visitors.

**FARMYARD MANURE.**—This matter was discussed at length. It was decided that the straw of the farm should be stacked near the stables and cow-yards, and put down during winter in sufficient quantity to absorb all moisture. After being well trodden by the stock, it should be put into a pit or heaped.

**OFFICERS.**—Mr. C. Harvey, elected chairman, and Mr. J. Ferries, jun., Hon. Secretary for ensuing year.

**Calca, November 6.**

Present—Messrs. A. Plush (Chairman), T. P. Cash, J. Dinsdale, F. W. Freeman, A. Newbold, A. B. Smith, and one visitor.

**EXHIBITS.**—Mr. Plush tabled samples of Gravestock's Frampton wheat, showing splendid growth; also grass, a fodder plant, and a weed which grows very thickly in cultivated land. The weed is a species of *Silene*, cultivated in cottage flower gardens. It should be destroyed in fields before it flowers.

**CROWS.**—Mr. Newbold suggested that combined action should be taken to destroy the large number of crows which are doing so much damage to the early crops this season. Mr. Plush said that strychnine dissolved in water would kill them. It was useless to try insoluble arsenic or strychnine. The poison must be dissolved. [Soda will dissolve arsenic, and acids or blood will dissolve strychnine. A single crow will destroy about 400,000 noxious insects—such as locusts, caterpillars, &c.—in a year. If the crows, magpies, plovers, larks, &c., are destroyed, we may give up all hope of reaping any crops or gathering any fruit.—GEN. SEC.]

**HAY.**—Mr. Cash said he had found that horses fed upon hay which had been cut when the grain had formed in the head stood their work much better than when fed on hay which had been cut just after the wheat had bloomed. Mr. Newbold thought hay should be cut when the grain has formed, and left on the field half a day, then cock, and stacked next day. Mr. Plush thought it should be raked into windrows, then cocked, and carted in when quite dry.

**RAINFALL.**—For October, 0·570in.

**Quorn, November 10.**

Present—Messrs. J. B. Rowe (Chairman), R. Thompson, James Cook, C. Potten, G. Baker, and A. F. Noll (Hon. Sec.).

**VISIT TO NEIGHBORING BRANCH.**—The Chairman and Mr. Thompson reported having visited Messrs. McColl Bros.' farm, in company with the Richman's Creek Branch. The wheat crops and system of water conservation was most interesting. Great good would result if Branches would meet frequently to exchange opinions and ideas, and a feeling of comradery would spring up amongst the farming community. The Hon. Sec. regretted the season had been so bad, as he had been trying a number of experiments with fertilisers. All his crops had looked well up to September, but the dry weather has spoiled the good effects. Every occupier of land should use his best efforts to conserve all the water possible. Even small patches of irrigated land would give good results.

**Arthurton, November 4.**

Present—Messrs. W. Short (Chairman), H. J. Freenan, M. Lomman, W. Smith, W. H. Hawke, J. Koch, C. Koch, T. B. Wicks, J. Pearson, H. Short, J. B. Rowe (Hon. Sec.), and five visitors.

**HOMESTEAD MEETING.**—This meeting took place, by invitation, at the residence of Mr. W. H. Hawke. After inspection of the garden and farm, refreshments on a liberal scale were provided by the host. Then delegates to the Field Trial Society's meeting reported that the crops offered so far were not suitable; but efforts were being made to secure some crops in the Arthurton district. The Committee then proceeded to make necessary arrangements. The next homestead meeting will be held at Mr. Wicks' farm.

**Colton, November 6.**

Present—Messrs. P. P. Kenny, T. L. Lewis, W. L. Brown, A. S. Bartlett, J. L. Dennison, M. S. W. Kenny, W. McElder, A. A. Stephens, and R. Hull (Hon. Sec.).

**EXPERIMENTS.**—Members inspected the experimental plots on the school grounds. There were fourteen varieties of wheat. Great praise was given to Mr. Stephens, the teacher. The boys of the school took the greatest interest in the progress of the plots. King's Early appears to withstand the heat and drought better than any of the others, and Purple Straw next.

**FLY BUG.**—Mr. Stephens produced some flying bugs, which are often very plentiful on wheat crops as well as upon numerous other plants. [These are the indigenous plant-bug, commonly called "pied fly-bug." They are provided with a beak or rostrum, which they drive into the plants and thereby extract the sap.—GEN. SEC.]

**LAND TENURE.**—Mr. W. L. Brown read a paper upon this subject. It dealt chiefly with the political side of pastoral occupation: and should not have been read at a Bureau meeting. Apart from the political side, he thought the rabbits were a legacy from pastoralists who had received value for improvements on resumed land; and rabbits were the chief cause of the increase in wild dogs. He asserted that, previously to the advent of rabbits, only one of fifty dingo pups lived, and nineteen out of twenty dingo sluts died of poverty whilst rearing pups. If the rabbits were killed, the dog question would be practically settled. When the railway from Perth to Port Augusta is completed, all the rich lands of the Gawler Ranges will be available for closer settlement, and be nearer a market than farmers on the West Coast are. He thought the better way would be to allow pastoralists to have the land rent-free until it is required to grow food for the people.

**Swan Reach, November 4.**

Present—Messrs. P. A. Hasse (Chairman), L. Baker, F. F. Brecht, L. Fidge, A. G. Zadow, J. H. Hohnberg, G. N. Lemke, J. D. J. Kohnke, P. J. Beck (Hon. Sec.), and two visitors.

**ROTATION OF CROPS.**—DISCUSSION of this subject resumed—Mr. Brecht said that, when he lived at Freeling, he found that he could only grow oats profitably as a rotation with wheat. He thought oats improved the land, as wheat grew better when following a crop of oats. The Chairman said that, in the Woodville district, when land was worn out with wheat, a final crop of oats was grown, and then the land was left in fallow for a season or two. Mr.

A. Hohnberg, as far as his experience went, found peas to be most suitable in this district as a rotation crop. Members considered rotation of crops to be beneficial.

**EXPERIMENTS.**—In most cases the seeds sent for trial by the Central Bureau have failed to germinate, owing to the drought. In the case of grasses, the Hon. Secretary recommended members to leave the soil undisturbed for several months, as they may germinate on the occurrence of favorable conditions. Mr. Kohnke recommended sowing rye with grass seeds, as this would protect the young plants, and could be cut for green feed. Mr J. L. Baker tabled five varieties of wheat plants. Dart's Imperial is considered suitable to this district. He also tabled Danish Island oats, and an indigenous grass.

### **Baroota Whim, November 6.**

**Present**—Messrs. F. H. Flugge (Chairman), M. Pillion, F. C. Besser, C. W. Hoskin, W. Brideson, J. E. Dunstan, and J. L. Watson (Hon. Sec.).

**EXPERIMENTAL.**—Mr. Besser will gather seed from Dart's Imperial wheat, but other members failed. Owing to the dry season it is doubtful if any melons, pumpkins, &c., will come to maturity.

**CROPS.**—Hay will probably not average over 2cwt. per acre, and wheat crops not over a bushel per acre. The wheats which appear to withstand the drought best are Budd's Rust-proof, Bearded, Purple Straw, and Smart's, in order named. Stock are in fair condition, and healthy.

**RAINFALL.**—For August, September, and October, 1·350in.

### **Kadina, October 4.**

**Present**—Messrs. T. M. Rendell (Chairman), P. Roach, G. E. M. Putland, M. Quinn, H. Johnson, W. Cowley, T. Jones, and R. A. Heath (Hon. Sec.)

**DAIRY CATTLE.**—The Chairman said he had seen some of the Friesland cattle at the Royal Society's Show in Adelaide. They were larger than Alderneys or Jerseys, and gave a good quantity of milk.

**CORRESPONDENCE.**—A deal of correspondence, locally interesting, was dealt with. It was resolved to recommend the Committee of the Northern Yorke Peninsula Field Trial and Show Society to retain £100 in the Savings Bank, and to continue to award certificates of merit as heretofore.

**REPORTS AND PAPER.**—Mr. Roach reported on rainfall; Mr. Quinn reported on "Drilling Cereals with Manures." Mr. Jones read a paper on "The Homestead," and a discussion ensued. [This report would have been more valuable had it been sent in earlier than November 12th, and had it given the amount of rain that fell, and the period during which it was recorded; also a digest of the papers and discussion thereon. The mere statement that such papers were tabled or read and discussed conveys no practical information to other Branches.—GEN. SEC.]

### **Kadina, November 1.**

**Present**—Messrs. T. M. Rendell (Chairman), D. Taylor, Jos. Martin, S. Small, G. E. M. Putland, and R. A. Heath (Hon. Sec.).

**BUSINESS.**—Correspondence was dealt with, and a lot of formal business in connection with the Field Trial and Show Society was transacted.

### Johnsburg, November 6.

Present—Messrs. F. W. Hombach (Chairman), T. Thomas, T. A. Thomas, L. Chalmers, T. Potter, J. Sparks, G. H. Dunn, W. McRitchie, and one visitor.

EXHIBIT.—Mr. Thomas tabled a large mangold grown by aid of watering.

FARM BOOKKEEPING.—Mr. Hombach read a paper on this subject. The following is the substance:—

Farmers should be as much business men as merchants and storekeepers; yet but few keep a daily record of operations and transactions. Such men seldom know which of their stock or crops have proved most profitable or otherwise. The question: What has been the cost of a pig or other animal from first to last? could only be answered by guess. There is much on a farm that cannot be reduced to figures, and placed on opposite sides of the ledger; but there are certain general principles of management just as applicable to this as to any other kind of business. Much haphazard can be avoided by the adoption of simple methods of bookkeeping. Farmers of the present day possess educational advantages which were not enjoyed by those of even fifty years ago, and can hold their own with anyone. Some of the present day farmers have been enabled to fill the best positions, and cases where they can neither read nor write are exceptional. The fault lies in the fact that farmers in many cases have not been brought up to the practice of keeping books of account. But in these times we need all our powers of mind and muscle to make farming pay. A record should be kept of all costs in producing certain crops, or in rearing certain animals. He suggested that the eldest or most capable son should keep a ledger, and daily enter up all receipts and expenditure on the farm, with particulars of work done during each week: all wheat, bran, &c., used to feed the live stock, and other particulars required. The eldest daughter could keep another ledger, with account of all dairy and household expenses, such as pounds of butter made, sold, used in home; eggs gathered, sold, and used; grain, &c., used for feeding fowls; groceries used, &c. If such books were kept for a few years it would be interesting work for the young people, and profitable for the farmer.

Members were of opinion that it would be a good thing generally to keep accounts; but not to enter into too minute details.

### Finniss, November 1.

Present—Messrs. W. W. Heath, (in chair), H. Langrehr, A. E. Henley, S. Eagle, J. Chibnall, and S. Collett (Hon. Sec.).

MANURES FOR CEREALS.—Members expressed opinions favorable to several brands of phosphatic manures, but gave no actual results. Resolved to try some Thomas' phosphate experimentally.

### Crystal Brook, November 6.

Present—Messrs. W. J. Venning (Chairman), W. Hamlyn, J. G. Young, J. C. Symons, A. H. Bennett, E. Pope, G. Davidson, R. Parry, and George Miell (Hon. Sec.).

FIELD TRIAL.—Arrangements were partly made with Port Pirie Branch to hold a field trial of implements about March next.

DRILLED CROPS.—The Chairman reported upon result of seed put in with and without manures at Field Trial held on April 7, 1897. The soil varied greatly in character from hard, red, sandy clay, free sandy loam, to strong black, sticky land. For ten weeks after there was not enough rain to bring the wheat up; and it was generally thought that, for such a locality, the seed was buried too deeply. In the hard, red, sandy soil, and in that which was black, strong, and sticky, the seed malted. On the friable soils the manure was decidedly advantageous to the crop; but on the heavier land it was not so apparent. This was most probably due to want of moisture. The fertilisers used were Sugar Coy.'s superphosphate, 1cwt. 1qr. to the acre; Thomas phosphate, 1cwt. 1qr.

per acre; bonemeal, 1cwt. 1qr. per acre; Kangaroo Island guano, 1cwt. 1qr. per acre; chemical superphosphate, 1cwt. with 1cwt. 20lbs. sulphate of ammonia per acre. As before said, the results on the friable loamy soil were very apparent, and Sugar Co.'s superphosphate fully doubled the crop, as compared with a crop broadcasted without manure. Thomas phosphate came in a good second; and the Kangaroo Island guano and the mixed chemicals a very good third. Bonemeal did not show so much improvement in the crop, probably owing to absence of rain. In every case the crops drilled in with manures showed a great advantage over those broadcasted without manure.

**FODDER CROPS.**—The Hon. Sec. reported red and white Kaffir corn (*Dhurra*), sown in September, doing very well; but the same sorts sown in October failed to germinate, owing to want of rain. *Agropyron repens* (Quack grass), and *Elymus condensatus* germinated only a few plants, but these appear, so far, to stand the drought very well, without any watering. Other grasses came up, but died off. Melons, squashes, marrows, &c., thrive with plenty of watering.

### Mount Pleasant, November 12.

Present—Messrs. G. Phillis (Chairman), P. Miller, jun., H. Dragomuller, H. A. Giles, and H. T. Hull (Hon. Sec.).

**EXPERIMENTS.**—Members reported favorably on prospects of crop of wheat from the seed imported by the Branch from Tasmania; also of potatoes from the same colony. These, however, badly need rain. The Chairman reported that the wheat crops put in with the drill on Mr. Giles' farm promised a very satisfactory return. Mr. Giles said he had put down about 100 tons of green barley, chaffed, as ensilage.

**PESTS.**—Mr. Dragomuller reported that "grubs" were destroying his young mangolds. Members wished to know whether lime ploughed in would do any good. [Most unlikely. Try the following:—Mix 8ozs. Paris green, 4lbs. molasses or honey, and 30lbs. bran with sufficient water to make a stiff paste. Break this up small and scatter along the rows. Many caterpillars eat greedily of this sweet mixture, and are destroyed.—GEN. SEC.]

### Yorke town, November 13.

Present—Messrs. J. Koth (Chairman), C. Domaschensz, G. Bull, J. Latty, F. Siebert, and J. Davey (Hon. Sec.), and one visitor.

**MANURING.**—Members met at the residence of Mr. Koth for the purpose of inspecting his manured wheat plots. Steinwedel wheat was sown in each case. No. 1 plot was manured with mixture of English superphosphate and Thomas phosphate, 40lbs. of each, per acre; No. 2 with 35lbs. each of Thomas phosphate and sheep manure; No. 3 with 35lbs. each Thomas phosphate and gypsum; No. 4 with 40lbs. each of sheep manure and gypsum; No. 7 with 80lbs. English superphosphate. There was little or no difference between these plots; the heads were filling out well, and should go from 7bush. to 8bush. per acre. Plot No. 5 received about 200lbs. of gypsum, and No. 6 100lbs. sheep manure per acre. These two were not so good as the others. After inspecting the unmanured paddock, members came to the conclusion that the extra return from the manured part would scarcely pay for the extra cost of putting in the crop. Other portions of the farm were inspected, and members entertained at tea.

**Inkerman, November 9.**

Present—Messrs. S. Diprose (Chairman), J. Sampson, R. Kennedy, C. H. Daniel, W. Fraser, and W. A. Hewett (Hon. Sec.).

**CHANGE OF SEED.**—This question was discussed at considerable length, and it was resolved that a change of seed wheat is very desirable, and that other Branches be asked to give their opinions as to which would be most beneficial; obtaining seed grown on poorer soil than that which it is proposed to sow, or *vice versa*. [Will members of other Branches kindly give their experiences in this matter.—GEN. SEC.]

**Mount Bryan East, November 6.**

Present—Messrs. H. Wilkins (Chairman), R. Webber, W. Brice, T. Best, E. T. Prior, W. H. Quinn (Hon. Sec.), and two visitors.

**MANURES.**—Considerable discussion took place on manuring. Mr. Best recommended applying plenty of wood ashes, also lime to the red soils. Mr. Brice said they did not get much benefit the first year from manuring, but later the returns would pay for the expense.

**Amyton, November 13.**

Present—Messrs. Jos. Gum (Chairman), W. Hawke, W. Gum, S. Thomas (Hon. Sec.), and one visitor.

**BUSINESS**—Owing to poor attendance, formal business only was transacted.

**Davenport, November 5.**

Present—Messrs. W. J. Trembath (Chairman), R. Fawcett, J. Fox, T. McDowell, J. Celento, J. Roberts, J. Holdsworth, F. B. Rathbone, H. Brown (Hon. Sec.), and one visitor.

**ENSILAGE.**—Mr. McDowell introduced a discussion on the conservation of fodder, and recommended ensilage. A considerable amount of green fodder could be preserved in this way. Mr. Fawcett asked whether the "Prickly Jack" (*Emex australis*) could be used in this way, but members were of opinion that it would not pay to gather. Mr. Rathbone considered from his experience that it was scarcely worth making ensilage, unless a crop was grown for the purpose. When the natural herbage was sufficiently plentiful to be used, chaff was also plentiful and cheap, and the labor and cost would make ensilage unprofitable. If weeds were allowed to grow in the garden to be utilised for making ensilage, as had been suggested, it would prove an expensive plan. Barley was one of the best crops to grow for ensilage. Mr. Holdsworth said in Victoria, Yorkshire Fog grass had been stacked, salt added, and weighted down, and had kept good for three years. Mr. Celento said lucern hay would prove of great value, but care was necessary in drying, or it would be spoilt.

**Petersburg, November 13.**

Present—Messrs. W. Miller (Chairman), R. Cochrane, R. McPherson, A. W. Jamieson, H. Earle, J. Wilson (Hon. Sec.), and one visitor.

**BRANCH BULL.**—Mr. Cochrane reported death of Ayrshire bull "Bonnie Laddie" belonging to the Branch. He was in good health and looking well to within two days of his death. Four or five of his own cattle had died within

a few days, and Inspector Needham, who visited his farm, attributed the deaths to æsthenic apoplexy. Other deaths had occurred, and the lung and liver of one animal was sent to Adelaide for analysis, the report being received that no trace of arsenic could be found. It was decided to write to the Commissioner of Crown Lands, asking whether it would not be possible for the department to discover the cause of death.

**WHEAT GROWING.**—This meeting was held at residence of Mr. T. Selby for the purpose of inspecting crops put in with seed and manure drill. A crop belonging to Mr. R. Cochrane was noticed, the growth of the plants having been arrested by the dry weather, and half of the length of the heads being white and without grain. Most of the crops seen were in similar condition, but wherever a little water had run the patches of crop were very good. Five cwt. per acre was considered an outside estimate of the yield of hay from these crops. Nearer Yongala they were better, but the heads were all blighted. Considerable discussion took place as to the cause of this—frost, dry hot winds, &c. being blamed. In the experimental plot, Thomas phosphate and bone phosphate were used, the former giving best results, though up to within three weeks the portion manured with bone phosphate promised to do better than the other. The unmanured portion was not so good as the manured, while the surrounding broadcasted crops were superior. The drilled plots were handicapped, however, by the seed remaining in the ground for thirteen weeks before sufficient rain fell to cause it to germinate.

**DAIRYING.**—Mr. O'Leary's paper on "The Best Dairy Cow" was read by the Hon. Sec., and an animated discussion ensued. Members agreed that the Ayrshire had given every satisfaction in the district, and it was decided that the Government be asked to obtain an Ayrshire bull for this district when again purchasing bulls for distribution.

### **Mundoora, November 5.**

Present—Messrs. J. Blake (Chairman), A. McDonald, W. Aitchison, W. Atkinson, N. J. Francis, W. J. Shearer, and A. E. Gardiner (Hon. Sec.).

**WHEAT GROWING.**—Considerable discussion took place on the prospects of the harvest. Those who had fair crops last season do not expect to reap so much this; but many who had poor crops last year have better this. The members agreed that taking a radius of six to eight miles round Mundoora, there will be more wheat harvested this year than last, provided good weather for ripening the grain is experienced. The Chairman called attention to statements in the Adelaide press giving the Holder Village Settlement the credit of introducing a new method of sowing wheat, *i.e.*, by sowing the seed first and ploughing it in. Members said this practice was adopted in the district twenty years ago, and in nearly all cases gave unsatisfactory results. "black rust" (*Urocystes oculata*) being specially prevalent in crops put in in this way.

**CATERPILLAR PEST.**—The Chairman reported destruction of young vines by night-feeding caterpillars, which hide in the soil in the daytime. Mr. Aitchison said he noticed this pest was always bad in dry seasons. [The following treatment has repeatedly proved successful in dealing with this pest:—Mix 8ozs. of Paris green, 4lbs. molasses or honey, and 30lbs. of bran with sufficient water to make a stiff paste. Break up into small pieces, and place some near each vine. The caterpillars eat this sweet mixture voraciously and are poisoned. —GEN. SEC.] The Hon. Secretary asked whether any member could tell him how to prevent ants from climbing up the fruit-trees. Mr. Shearer said a little arsenic mixed with sugar and placed near the trees was very effective in destroying ants. Mr. Atkinson said he had used a similar mixture with very satisfactory results.



### Cherry Gardens, November 9.

Present—Messrs. J. Potter (Chairman), J. Lewis, G. Brumby, J. Choate, J. Nicollie, G. Hicks, W. Nicollie, C. Ricks (Hon. Sec.), and three visitors.

WEED.—Members reported that the common red poppy was becoming a very serious nuisance in the district, and it was decided to urge on all land-owners the necessity for destroying it as soon as it appears. Members thought the seed must have been introduced in chaff brought into the district.

LUCERN PEST.—This pest (*Smythurus viridis*) is doing considerable damage, and members wished to know whether there is any effectual remedy for it. [As far as is known there is no real remedy for this pest. Where it attacks the lucern plots it can be kept under by dressing with gas-lime, feeding down with sheep and other methods, but the treatment must be frequently renewed. Where vegetables and other plants are attacked, probably the only treatment feasible would be spraying with 1oz. Paris green, and 1lb. of fresh lime in 12galls. of water; but it would not be safe to do this within two or three weeks of the gathering of the crop. Spraying with one part of ammoniacal liquor from the gasworks in four parts of water destroys those it comes in contact with, but frequent application would be necessary.—GEN. SEC.]

BRANCH SHOW.—It was decided to offer a special prize at forthcoming show for produce grown from Bureau seeds.

### Maitland, November 6.

Present—Messrs. C. F. Heinrich (Chairman), W. Wilson, A. Jarrett, J. Smith, H. R. Wundersitz, Thos. Bowman, J. S. McLeod, H. Bawden, C. E. Moody, and C. W. Wood (Hon. Sec.).

APRICOT DISEASE.—Some discussion took place on the new disease amongst apricot trees. Several members reported losses caused by it, the symptoms being that the leaves turn black at the edges and curl up, the shoots die off, and then the branches, and finally the tree succumbs.

BINDER AND HEADER.—Considerable discussion on paper read at previous meeting took place. Mr. Wundersitz said he got one penny per bushel more for wheat harvested in this way, and in addition found his stacks of straw of great value. It was stated that many farmers in the district will harvest their crops with the binder and header this season.

SELECTION OF WHEAT.—Mr. Smith read a paper on this subject, as follows:—

If it is possible to greatly improve wheat by selection, it is a subject of great importance to us as wheat growers. It is admitted in the breeding of all farm stock that great care in the selection of the parents is necessary if we wish to raise a superior class of animal, and in the vegetable kingdom the same law obtains that "like produces like." I have experimented for seven years in selecting ears of what appeared superior kinds of wheat from amongst the crop, and then sowing the seed carefully by themselves; and, although owing to drought, the ravages of sparrows, &c., the results have not been so successful as I could have wished, they all went to show a marked improvement on the parent ears, in those which escaped destruction. It is not every farmer who understands cross-fertilization, which is a very delicate operation; but by carefully examining our crops about, or a little before the time they ripen, and selecting ears which may appear of a superior kind, and then carefully carrying out a process of selection, I feel convinced that in time we will so improve on the varieties of wheat now in existence that we will be able to reduce to a minimum the ravages which are sometimes caused by red rust; and also, by developing early maturing varieties of a valuable kind, to reduce very largely the devastation caused by the droughts to which our colony is so liable. As an illustration of what can be done by repeated selection, I think I cannot do better than quote from a paper read some two

or three years ago before the Royal Agricultural Society of England, showing in the following table the importance of each additional generation of selection, no manure being used or artificial means of fostering the plants resorted to:—

Year.	—	Length	Number of Grains.	Number of Ears in each Stool.
		Inches.		
1857	Original ear .....	4 $\frac{1}{2}$	47	—
1858	Finest ear .....	6 $\frac{1}{4}$	79	10
1859	Finest ear .....	7 $\frac{3}{4}$	91	22
1860	Ears imperfect, wet season .....	—	—	39
1861	Finest ear .....	8 $\frac{3}{4}$	123	52

Thus by means of repeated selection alone the length of the ears has been doubled, their contents nearly trebled, and the tillering power increased fivefold in the short space of four years. The essayist explains the reason why he commenced with so small an ear to be as follows:—"He had for several years previously experimented with, accidentally, large ears, irrespective of the quality of the grain they contained, the invariable result was a sample so coarse as to be almost unsaleable. Convinced that this did not naturally result from the attainment of a perfect growth in the plant but rather arose from the fact that the large parent ears from some peculiarity of growth themselves contained coarse grain, he determined to commence with a fine quality of grain, irrespective of the size of the ear, trusting to pedigree for the gradual attainment of fine ears. The plan of selection pursued was as follows:—A grain produces a 'stool' consisting of many ears. He planted the grains from these ears in such a manner that each ear occupies a row by itself, each of its grains occupying a hole in the row, the holes being 12in. apart every way. At harvest, after the most careful study and comparison of the stools from all these grains, he selected the finest one as a proof that its parent grain was the best of all under the peculiar circumstances of that season. This process was repeated annually, starting with the proved best grain, although the verification of this superiority was not obtained until the following harvest. During these investigations no single circumstance had struck him so forcibly as illustrating the necessity for repeated selection than the fact that of the grains in the same ear one was found to greatly excel all others in vital power. It was thus far seen that pedigree in wheat, combined with a natural mode of cultivating it, had increased the contents of the ears." The above, I think, tends to prove that wheat can be greatly improved by careful selection, and that if we are always careful to select those plants which seem to possess the qualities most suited to our climate, we may in time hope to develop superior varieties of wheat to those which at present exist, and which I think would assist us to more successfully combat the many vicissitudes of climate with which we have to contend in our efforts to produce the golden grain in quantities sufficient to enable us to live at the low prices which I am afraid we must expect to rule when we depend upon the European market.

Considerable discussion ensued, many of the members advocating the selection of the best heads in the crop as a means of obtaining a fresh and good supply of seed.

### Port Elliot, October 30.

Present—Messrs. C. H. Hussey (Chairman), F. T. Fischer, P. O. Hutchinson, H. Green, J. Brown, E. W. Hargreaves, O. J. Whitmore, W. E. Darwin, and E. Hill (Hon. Sec.).

**DAIRY CATTLE.**—The following resolutions were carried:—"This Branch does not approve of the Government introducing any particular breed of cattle." "This Branch is of opinion that to encourage private enterprise in the importation of livestock, part of the cost of quarantine should be borne by the Government."

**FEED FOR DAIRY COWS.**—Mr. Hargreaves said he had noticed the value of maize for dairy cows had been questioned. He had three cows which on ordinary grass yielded 10lbs. of butter weekly; when fed with mangolds the yield increased to 13lbs., and on maize to 20lbs. When mangolds were again fed to them, the yield went down to 13lbs. per week.

**Appila-Yarrowie, November 5.**

Present—Messrs. J. H. Bottrall (Chairman), J. C. W. Keller, J. M. Grant, J. W. F. Hill, W. C. Francis, J. Daly, J. O'Connell, W. Stacey, P. Lawson, H. Klemm, C. G. F. Bauer (Hon. Sec.), and one visitor.

**ANNUAL REPORT.**—The Hon. Sec. in his annual report reviewed the doings of the Branch since its inauguration in December, 1890, with seven members. The average attendance at the meetings during the seven years had been over nine, which was good, when the fact that for several years the membership did not exceed twelve was borne in mind. Twenty-one practical papers have been read and discussed, and visits and lectures by members of the Central Bureau, the Conservator of Forests, and others arranged. The Conference of Northern Branches was inaugurated by this Branch. It has only been necessary to strike one member off the roll for non-attendance.

**MIXED FARMING.**—The Chairman read a short paper on this subject. He considered the old adage, that you should not carry all your eggs in one basket applied particularly to farming. Wheatgrowing alone is not profitable. A few cows help to keep the land in good order, keep down the store bills, and bring in a little ready money. It is, however, useless attempting to make a profit out of dairying unless supplies of fodder are provided. With dairying, pigs are a necessary and profitable adjunct. Poultry-rearing is another source of profit. He found it of special service, especially in such a season as last, when the crops were so poor. Sheep are also necessary. They help to keep the land clean, and bring in money for both wool and lambs, regardless of season, if feed and water are provided. The fruit and vegetables required for the home should, as far as possible, be grown on the farm; and care should be taken of all hides, sheep and other skins, horsehair, &c., which can be turned into money. These may not individually be worth much, but together they help to pay expenses. Members generally agreed with Mr. Bottrall, and Mr. Lawson said the by-products of the farm often paid him better than his wheat.

**BRANCH CONFERENCE.** It was decided to write to Orroroo Branch, asking whether they intended to arrange a conference of Northern Branches early next year.

**BINDER-TWINE IN CHAFF.**—Mr. Lawson said some chaff merchants did not remove the twine from the sheaves when chaffing, but cut it up along with the hay. Being quite indigestible, the pieces of twine had a very injurious effect on stock. He had lost some of his horses, and on opening one of them he found numerous balls of twine of various sizes, to which he attributed the death of the animal. He proposed that the Branches be asked to take this matter up, with a view to stopping the practice. Other members agreed as to the ill-effect of the twine in the chaff.

**Tatiara, November 6.**

Present—Messrs. G. Ferguson (Chairman), J. Rankine, G. Milne, R. Scown, H. Killmier, Thos. Stanton, F. Smith, E. Prescott, J. Green, and W. E. Fisher (Hon. Sec.).

**SOUTH-EASTERN CONFERENCE.**—In reply to inquiry from Penola Branch, it was resolved that the next Conference of South-Eastern Branches shall be held at Bordertown on a date to be fixed later on.

**DAIRYING.**—It was decided to ask the Central Bureau to recommend the Minister of Agriculture to obtain a good Shorthorn bull in the next lot of bulls to be purchased.

**LIME ON CLAY SOIL.**—Mr. Smith asked for information respecting the use of lime on stiff clay soils. None of the members had any experience on this matter, and it was decided to ask the Central Bureau for information on the subject. [Quicklime, or newly slacked lime, scattered broadcast on heavy clay land, to the amount of 40bush. per acre, will make the soil friable, and the good effect will last for several years. The lime may be harrowed or scarified into the soil, but should not be ploughed under.—GEN. SEC.]

### Mount Gambier, November 13.

Present—Messrs. M. C. Wilson (in chair), G. G. Collins, J. C. Ruwoldt, J. Dyke, J. Bowd, T. H. Williams (Stock Inspector), W. Mitchell, W. Barrows, and E. Lewis (Hon. Sec.).

**DIPPING SHEEP FOR TICKS AND LICE.**—Mr. Stock Inspector Williams read the following paper on this subject:—

The compulsory dipping of sheep for ticks and lice came into force six years ago. Three years later the flocks of the South-East were fairly clean, but now, unfortunately for the owners, they are badly infested with the parasite known as the "tick" (*Ixodes reticulatus*), and the sheep louse (*Trichodectes sphaerocephalus*). The annual loss caused by these destructive pests cannot be definitely estimated; if it could, the figures would surprise even those who are already aware it must be very heavy. The loss in the value of wool alone must be many thousands, and the loss in the condition and natural growth of the sheep many thousands more.

Few appear to attempt to think this important matter out in a rational way, and give it the attention it deserves. Many see their sheep infested with these parasites at shearing time—see the sheep and lambs low and weak, and realise that their clip is light, dirty, and the fleeces ragged, with probably a break in the fibre. They have to sell such wool at from 4d. to 5d., when good sound clean wool is realising 8d. to 10d. in the same market. It never occurs to these people that they, in consequence of their neglect and want of management, are responsible for this unsatisfactory and deplorable condition of things, by allowing the sheep, after finding them infested, to remain so for months prior to shearing. To comply with the compulsory dipping regulations they (many reluctantly) put the sheep through any of the various dips that may have taken their fancy; some, it has been stated, fancying water alone. They turn the sheep out, and feel quite satisfied they have done their duty to the sheep, their neighbors, and themselves. If such owners studied their interests, as they might be expected to, however, they would soon discover that it would pay them, and that well, to keep their sheep free of ticks and lice the whole year through. Many of them will argue that this cannot be done, "because," they say, "the sheep breed ticks and lice in bad seasons." Every season is not a bad one, and yet we find parasites on thousands of badly dipped and neglected sheep, while those that are properly dipped in bad seasons are clean. It probably never occurs to the negligent sheep-owner that the hundreds of ticks and thousands of lice on the sheep are causing constant irritation and thereby loss of condition to the animal. But this is not all. Both these parasites live on the blood they suck from the unfortunate sheep. Sheep, if hurriedly examined, may appear to have only a few ticks and lice on them, the observer thinking only of those he has seen; but hidden away in the wool there will be thousands of these little blood-sucking creatures, and every twenty-four hours each one of them will have drawn many drops of blood from their victim, and it is quite probable that a badly-infested sheep may lose a pint in that time. This drain on their systems is greater during the winter months, when the grass is scarce and weak, and nature is not receiving sufficient nourishment to support the sheep and feed the unwelcome occupants of its fleece. The sheep fall off in condition and pluck their wool out with their teeth—many pounds of it in some cases. When this state of things is pointed out to some owners, they, in a bland and innocent way, accuse the poor sheep of breeding the parasites. These parasites, like other members of the animal kingdom, breed among themselves, and find the improperly dipped and badly-managed sheep, suitable victims to live and feed on. If the sheep are dipped thoroughly in some of the well known and proved dips for one minute, they will at once cease to breed these destructive parasites, will improve in condition, and produce good, sound, marketable wool, that will yield the owner double the price the tick and lice-stained ragged fleece from the dirty neglected sheep will. The childish arguments of some owners as to the cause of the parasites on their sheep is amusing at times, if nothing more.

### Ticks.

These parasites are too well-known to need describing. They can and do live off the sheep, and may sometimes be found on the tea-tree, &c., about low lying swampy country. Mr. H. Morris, of Conmurra, and others have seen them, and the writer has frequently observed them. They counterfeit the color of the bark of the tea-tree, and can probably exist on sap for a time. When opportunity offers, however, they attach themselves to sheep, and suck blood, which causes their color to change to a brown. They breed on sheep, and prefer to remain on those of medium condition.

Recent investigations carried out by Messrs. A. Meek and R. Greg-Smith, B.Sc's., at the Durham College of Science in England, in connection with the "scrub tick" of Australia, throws quite a new light on a disease which frequently occurs in the South-East. When it had been settled beyond doubt that the cattle tick of Texas and Queensland (*Boophilus Bovis*) conveyed the micro-organism of Texas, or redwater fever to cattle, scientific minds conceived the idea that ticks common to our other domestic animals might also prove to be the conveyors of disease-causing germs. Messrs Meek and Greg-Smith made investigations, microscopical and otherwise, which went to prove this was the case. In England there is a disease among sheep and lambs known as "louping-ill" or "hydro rachitis"—known in the South-East as "rechitis"—the cause of which was not definitely known. The results of their investigations go to prove the existence of a bacterium, which, they say, is pathogenic, and is associated with the louping-ill or rechitis and the tick. They say—"The location of the bacteria which we have found show that they (the sheep) are inoculated by the tick, and it follows that the tick must have carried them from the soil. It is more than likely, too, that the presence of the bacteria on the tick is quite accidental—that is to say, is not an essential part of their life history. The bacteria, moreover, must be characteristic of the soil or pasture on which the louping-ill occurs." After noting the results or conclusions arrived at by the above-mentioned investigators, it occurred to the writer that the South-Eastern sheep might be inoculated by the tick. Opportunities occurred which led to two microscopical examinations being made of blood from lambs affected with rachitis, also the blood from ticks found on them. In both cases a micro-organism, similar to that found in England, was present. Owing, however, to the need of a proper laboratory and accessories, the investigations could not be carried further by the cultivation of the bacteria in test tubes, and subsequent inoculation of lambs with pure cultures to reproduce the disease.

Anæmia, or deficiency of blood, is another disease very prevalent among many flocks in the tick infested areas of the South-East, and affected sheep are frequently pronounced by some to be "coasty." During the writer's inspection of many sheep which were affected with anæmia, they were invariably infested with ticks. This led to a number of microscopical examinations being made of preparations from the watery, deficient blood from the sheep, and from the ticks found on them. In these preparations a minute bacteria was also present. Its appearance is very similar to the one found in rachitis. They were numerous and very active. They attack the blood discs (corpuscles) and cause them to break up, thus reducing the blood of the affected animal to a watery state. That ticks, passing from diseased to healthy animals, carry the bacteria, with which they become contaminated, there is little doubt. Much more might be written about these micro-organisms, but sufficient has been said to show the sheepowner that he must keep his sheep free of ticks, if he wishes to keep them free of disease.

### Lice.

These parasites are very minute, less than one-eighth of an inch long, and are difficult to see. They are of a pinkish color—when gorged with blood—and lay close to the skin of the sheep. Careful search is necessary to find them. If a few are found on opening the wool, it is probable there are thousands on the sheep examined. A low power lens will aid anyone in search of them. They multiply very rapidly, and their eggs, which are very minute, are deposited close to the roots of the wool, where they are hidden by particles of yolk, &c. The embryo is surrounded by a shell, which is covered with a protecting greasy substance. Lice, like ticks, can live for a long time off the sheep, under certain favorable conditions. Dipping readily kills the parent louse, but the minute egg, in its protecting coat of grease, is not affected by any dip, but remains to germinate and infest the newly-grown wool, which is usually free of the properties of the dip used. The writer has carefully observed over 100 cases of dipping for lice, and in no instance have the sheep been completely freed of the parasite in one dipping, though some of the best dips on the market were used. The nearest approach to cleaning sheep in one dipping was with the home-made arsenic-sulphur dip, and in that case a few lice were found at shearing. Investigations, to prove whether the sheep louse, like his intimate associate the tick, is a probable communicator of disease, due to bacteria, have not been carried out; but, seeing he is a bloodsucker, it is quite possible he may prove a source of danger.

An instance, showing how rapidly lice will spread from infested to clean sheep was

recently brought under the writer's notice. An infested animal got into a paddock among twenty clean sheep, and in fifteen days all were infested. Another case showing how well dipped sheep remained free from the attacks of the louse came under notice at Millicent, where about ten long wool sheep, that had been dipped in Cooper's dip, were in the local pound with badly infested sheep for over a fortnight and remained quite clean, thus proving the advantage of using a dip the properties of which will remain in the wool and render it objectionable to all parasites.

There is another important reason why sheep, especially lambs, should be kept free of external parasites, which suck their blood and cause irritation. Our South-Eastern flocks are, unfortunately, prone to periodical attacks of lung, stomach, and intestinal worms, as well as fluke in some localities, and it naturally strikes any one that by freeing the sheep of external parasites—and keeping them free—by thoroughly dipping them, they will be better able to withstand the drain on their systems caused by the internal ones. Many sheep, too, while passing through the dip, probably swallow some of it, which acts as a vermifuge.

Many owners object to dipping a second time in the season on the grounds that it knocks the sheep about and stains the wool. One of the most practical station managers and sheepowners in the South-East put the whole question in a nutshell quite recently, however. He had 1,500 crossbred four-tooth sheep badly infested with tick and lice. They had been dipped, by order of the writer, for lice in December, 1896. In August last lice were in thousands on them again. They were plucking their wool out, and falling off in condition, though on good grass. He said, "If I allow the sheep to remain in their present dirty state till shearing time the wool will be dirty and ragged, and the sheep will have lost more than 1s. per head in value—if I dip, the wool will be worth quite as much and I shall save the condition of the sheep." The sheep were dipped and are in splendid condition to-day, and the wool will probably realise full market value. Many other cases, where owners have dipped a second time—between May and July—might be referred to as showing the advantage of freeing sheep from parasites, but one more will suffice. A line of ewes and lambs which were infested were dipped in May last. An improvement—in the lambs especially—was soon apparent, and most of them have since been sold fat in the Adelaide market. All who have dipped their sheep a second time in the season are fully satisfied with the results. Owners should look further ahead than the stained wool, and consider the improved health and condition of their sheep. Expert wool-buyers will place more value on wool from healthy sheep, though it may be a little dip-stained, than they will on that from bloodless creatures, which produce fleeces with a weak fibre and stained with tick and lice.

Owners must use their own discretion as to which of the many dips on the market they use. The writer would, however, advise the use of powder dips in a wet district like the South-East, as the properties of carbolic dips are more readily washed out of the wool. The home-made arsenic dip is objected to on the grounds that it checks the growth of the wool for a time, causes it to feel harsh, and is severe on wounds inflicted on the sheep during shearing if they are dipped directly off the shears. We need not go further than Mingbool Station, however, where arsenic alone is used as a dip, to show that its effects on the wool cannot be injurious. The sheep there yield splendid fleeces: they are always free from parasites, and top prices are obtained for their wool.

All authorities on dipping urge that sheep must remain in the dip one minute or more; and one of the most satisfactory cases of dipping that came under the writer's notice this season was where the sheep were one minute in the bath, six sheep a minute passing through together.

If sheep are infested with ticks or lice at shearing they should be dipped off the shears. About February owners should again carefully examine every sheep for parasites—especially lice—as they begin to appear in numbers then and on till August. If lice, or numerous ticks, are found, the sheep should be dipped in clean dip, prepared according to instructions on the packets, and the strength kept up. This is important.

The following is the recipe for mixing the arsenic Sulphur Dip:—Put 100ozs. of arsenic and 10lbs. of soda into 30galls of water, and boil for half an hour. Dissolve 20lbs. of home-made or soft soap and add to the above. Add this to 400galls. of water in the dip, and if sulphur is desired—and it should be used—boil 40lbs. of it for forty minutes, and add it to the dip. Stir well when boiling. A few pounds of soda should be added to the sulphur when boiling. The cost per 1,000, if this dip is used, is about 7s.

Many owners have thoroughly cleansed their flocks of ticks and lice—some of them on most unfavorable country—by carefully dipping them twice in the season, and what they have done others can do. The writer would urge every owner of infested sheep to face this important matter in a reasonable and determined way, and try dipping their sheep twice a year for two years. If this is done the health of the sheep will be sound, and they will be free from external pests.

Mr. Dyke said he bought four pigs only a week previous, and two had developed rickets. Mr. Williams had heard of similar cases; they might be caused by softness of the bowels, parasites, or bacteria, or tapeworm. In reply to question, he said he found Cooper's dip more satisfactory than any other; the others did not appear to have the same staying powers, especially the carbolic dips. Members considered straggling sheep the cause of great danger, while it was stated that infested sheep were sometimes dropped into a paddock. Mr. Williams said that anyone doing this was liable for heavy damages. This had become a serious matter to the South-East, as many people were not getting half the value they should for their wool owing to damage by parasites. Mr. Dyke said it was only within the last two years that it had been thought necessary to dip twice; it was formerly thought to be injurious to the wool. Mr. Williams said the injury, if any, was very small. He had seen sheep dipped as late as August, and the wool was in splendid condition. If clean dip were used, and the instructions followed, no damage need be feared; but if they dipped their sheep in dirty stuff, in which thousands had previously been dipped, they need not wonder if the wool was stained. A hearty vote of thanks was accorded Mr. Williams for his paper.

**TAPEWORMS.**—Mr. Williams reported having examined a rabbit's liver a few days ago, which was found to be teeming with eggs of tapeworm. The normal appearance of the liver was completely altered by the mass of eggs.

### Balaklava, November 13.

Present—Messrs. A. Manley (in chair), J. Vivian, E. Roberts, A. Hildebrand, P. Anderson, and E. M. Sage (Hon. Sec.).

**CONFERENCE.**—It was decided to co-operate with Kapunda Branch in holding a Conference of Lower Northern Branches at Kapunda in March next.

**THICK v. THIN SOWING.**—A discussion took place on the relative merits of thick and thin sowing in dry seasons. Mr. Manley said one of his neighbors always contended that a bag of seed should sow nine acres, and he always got fair crops from his land. Mr. Hildebrand said the thinnest sowing he ever made gave as good a return as thick sowing; he used hand-thrashed seed. Members agreed that thin sown crops stand the dry weather, and give the best crops in dry seasons.

### Dowlingville, November 5.

Present—Messrs. R. A. Montgomery (Chairman), T. Illman, T. Kenny, G. Inkster, T. Lee, F. Roberts, J. Phelps, H. Crowell, G. Mason, J. L. Broadbent (Hon. Sec.), and one visitor.

**MANURE EXPERIMENTS.**—Mr. Illman tabled samples of King's Jubilee and Early Para wheats, both being very forward and well headed. Mr. Roberts tabled several samples of Big Purple Straw wheat, showing the effect of manuring. No. 1 manured with superphosphate was 3ft. 3in. high, and splendidly headed; without manure 2ft. high, thin small head; lime, 2ft. 3in. high, good head. Mr. Kenny tabled several samples of Big Purple Straw from seed drilled in at same time, and under similar conditions. That manured with Melbourne bone manure was 3ft. high, with good head; lime, 2ft. 6in. high, fair head; English superphosphate, 3ft. high, good head; chemical works bone-dust, 3ft. high, fair head; chemical works super-guano, 3ft. 9in. high, splendid head; bone-phosphate, 3ft. high, very well headed. [In reporting results of such experiments, the quantity of manure per acre used and the cost should be

stated.—**GEN. SEC.**] Mr. Montgomery tabled two samples of wheat from same area of ground, one being put in with drill and manure, and the other broadcasted. The former gave twice the quantity of hay, and was far superior in sample to the latter.

### **Paskeville, November 13.**

**Present**—Messrs. J. C. Price (Chairman), H. F. Koch, A. Palm, A. C. Wehr, J. Bussenschutt, A. Bussenschutt, G. Meier, and J. H. Nankervis (Hon. Sec.).

**MANURING.**—Mr. Jos. Correll, of Minlaton Branch, forwarded interesting paper on "Fertilisers for Oats," which was well discussed.

**FIELD TRIAL.**—Matters in connection with the field trial of harvesting implements at Messrs. Lomman & Freeman's farm, near Agery, on December 8, were dealt with.

### **Richman's Creek, November 8.**

**Present**—Messrs. W. Freebairn (Chairman), J. McSkimming, W. Rodgers, M. Hender, A. Knauerhase, W. J. Wright, J. M. Kelly, J. J. Scarle, P. J. O'Donohue, A. Nicholson, J. J. Gebert, J. McColl (Hon. Sec.); R. Thompson and J. B. Rowe, of Quorn Branch; and three visitors.

**WHEAT EXPERIMENTS.**—This meeting was held at Messrs. A. & J. McColl's farm, for the purpose of inspecting the crops and experimental plots conducted by them. A crop of sixty acres of Bearded wheat, grown for several years, and selected by Messrs. McColl, was inspected, and found to have stood the drought well, is fairly thick and even, and will probably average 8bush. per acre. Two fine dams of water, which are filled from an adjacent creek by means of spouting, were seen, and it was also noticed that feed was plentiful on the farm. A quarter-acre plot of Beauty of Hebron potatoes was so badly attacked by locusts that it was thought the crop would not mature properly. Some Red Straw wheat, portion of which was manured with Thomas phosphate and portion with kainit, was next inspected; but no difference was noticeable where the manure had been used. This variety will probably give 3bush. per acre; but, being a rather late variety, is likely to be injured by locusts, which are plentiful. A twenty-acre paddock of Allora wheat looked good enough for 5bush. per acre, the straw being very fair. In the experimental plots, strips of land were sown with Carmichael's Eclipse, Red Straw from selected heads, Bearded, and a variety from Mount Gambier. It was generally agreed that the Bearded had stood the drought best, and would give a better return than the others, though the Eclipse, of which only 28lb. of seed per acre was sown, looked well. Allora was the best of the others. In the manure plots the Bearded also showed best, but members considered that manuring was scarcely profitable in this district, as the soil was so good that the light rainfall did not allow of its being easily exhausted. Members reported crops elsewhere in the district to be much inferior to those inspected, and Mr. Rowe, in proposing a vote of thanks to their hosts, attributed the good results to careful cultivation, and to the fact that the hard subsoil retained the moisture in a dry season.

**TIME OF SOWING.**—Mr. McSkimming initiated a discussion on sowing wheat before or after rain. His experience had been that when he sowed before rain his crops were never so good as those sown after rain. He thought they should have the ground in readiness to sow when rain comes, as it did not take long to put the crop in. Mr. Knauerhase thought cultivation after rain much more beneficial than before rain; some advocated harrowing the



land after sowing. Mr. McSkimming thought "smut" would be more prevalent if this practice was adopted. Mr. Wright said he tried sowing portion of the crop after rain this year, and until quite lately it looked to give better results; but now the early sown crops promised to give the best crop. His twenty year's experience in the north was that as a rule the early sown crops did best, though in sandy soil late sowing might be right. The Hon. Secretary said if land is worked wet one year and then dry for one or two years the result would be reduced crops. Cultivation was unfortunately done when the soil catches the hot weather, and it might be an advantage if the ground could be worked wet when fallowing. If the ground was harrowed before the crop is up, the seed would have all to be pickled. Harrowing the growing crop was also referred to, the opinion generally being that it was not a success in this district unless rain soon followed. Mr. Rowe agreed with the Hon. Secretary that rolling just after seeding was a good practice; the clods were broken, the seed covered, and the land improved for the harvesting implements. Other members agreed, but Mr. Hender thought there would be a danger on the plains, where they got a very smooth surface after rolling, of the water running off; a light harrowing after rolling would probably do good.

**UTILISATION AND CONSERVATION OF WATER.**—Mr. Searle initiated a discussion on irrigation, and how to get water. A system of reservoirs and pipes would be too expensive, but large quantities of water ran to waste from the creeks, especially from the Willochra. Where the land had been flooded this season from the overflow of the creeks the crops were very fair, while in other places they were very poor. Something could be done on the travelling stock road to turn the floodwaters on to the wheat-paddocks, and also by weirs, cuttings, &c. The water in the creeks could be put to the same use. If the Government would construct weirs and fords in some of the larger creeks, the farmers could easily do the rest of the work. Mr. Hender thought it would be better for the farmers to construct the weirs themselves, but the work would need to be very substantial; he had made one which would cause the water to flow over 200 acres. On 50 acres he had flooded he got more feed than from 1,000 acres not flooded. One member thought there would be a danger of the floods destroying the crops at harvest-time unless proper flood-gates were made. The Hon. Secretary said the farmers might make a lot more use in this way of the small creeks running through their lands. With Mount Brown Creek, which even during the past season had been running for weeks, an open channel could carry water to a number of farms. Several members thought the Mount Brown scheme one of the best that had been proposed in the north, while others thought it would never pay for irrigation purposes. The Chairman said there was no doubt much could be done to utilise the water running to waste in the creeks. He knew of a case where water had been brought for two miles with a fall of 1in. in 16yds.

**RAINFALL.**—For October, 0·360in.

### Strathalbyn, November 1.

Present—Messrs. M. Rankine (Chairman), B. Smith, R. Watt, H. H. Butler, J. Cheriton (Hon. Sec.), and W. C. Grasby (Central Board).

**PIG-BREEDING.**—Mr. Watt read the following paper on this subject:—

Young pigs appear to thrive best when they have a hole in the sty to run out and in as they like. The old sows want a nice dry place to litter in, with not much straw for a day or two, as the young ones are easily smothered. Warm skim milk for the sow to drink for a day or two, then plenty of feed, and the young ones will be ready to wean at six weeks old. If they are not well fed, eight weeks is none too old to wean them. There is no food better to give pigs than I know of than peas; it makes good solid pork, nice and

sweet; and porkers that are fed on peas stand the journey into market better. They keep far firmer than those fed on pollard or wheat. I find the Berkshire breed is fit for market the quickest, and I think they make the best bacon, but they eat a lot. I like to keep a Berkshire hog, and not too pure Essex sows. The young pigs seem to thrive well, and grow to be nice porkers at six months old. In my opinion it pays better to rear your own pigs than to buy weaners or slips. I know at times store pigs are very cheap, but if you keep cows you have the skim milk or whey to feed the young ones, and taking one year with another it will pay to fatten pigs on grain. By feeding pigs on grain you get a good deal of manure on the land, and grow more hay and more grass; so in looking at the profit in keeping pigs we have to take that into consideration too. I believe that breeding sows can have two litters a year for four years, when they should be fattened up and sent to market. I do not think it is well to allow a breeding-sow to get real fat, as they do not rear so many young ones again. I try not to let them get more than half fat. For the last six weeks in fattening, pigs should have nothing but solid food; no green feed, as it discolors the pork or bacon.

Considerable discussion ensued, members generally agreeing with Mr. Watt's

### Mount Compass, November 13.

Present—Messrs. J. Youlton (Chairman), R. Peters, W. Gowling, W. Wright, F. Slater, T. Chaplin, C. S. Hancock, A. J. Hancock, H. McKinlay (Hon. Sec.), and two visitors.

**BLINDNESS OF COWS.**—Mr. Chaplin reported that cows suffering from blindness, as reported on previous occasions, were now getting better without any special treatment. He was inclined to attribute it to the poor quality of the feed in the scrub, and the animals soon showed an improvement when stall fed or allowed to run in good grass paddocks.

**EXHIBIT.**—Mr. Wright distributed seed of Grand Rapids Sweet melon which he found of excellent quality, and medium size.

### Norton's Summit, November 6.

Present—Messrs. J. Jennings (Chairman), J. Pellew, A. Smith, J. Bishop, J. J. Bishop, and W. H. Osborne (Hon. Sec.).

**CODLIN MOTH.**—It was resolved that it be a suggestion from this Branch, that a plan of Mr. Quick's garden, showing the portions treated by the Inspector of Fruit, and the portions not treated, be published for the information of fruitgrowers unable to visit the orchard. [This would entail considerable expense, and at present, at least, would serve no good purpose. When the report on the experiments is prepared, the question of publishing a descriptive plan of the orchard will be considered.—GEN. SEC.] The letter from the General Secretary, stating that it was unnecessary for the department to test the efficacy of spraying with arsenical poisons for suppression of codlin moth in the Hills as well as on the Plains, as the insect would be equally amenable to treatment in one part as in another, was discussed. The members took exception to his statement, that the question of cost of treatment was quite another thing, and respectfully insist that the cost is the vital point of the whole matter. It was pointed out that the deputation of Hills growers, which waited on the Minister of Agriculture, asked that spraying should not be enforced until it was proved that it was effectual, and could be profitably carried out. [The cost of spraying with hired labor will be published in connection with the experiments now being conducted. Naturally, the cost will be greater where the trees are growing upon steep hillsides, and greater still where the trees are very large, and perhaps old and neglected. If the Department can prove that spraying with arsenical compounds is just as effective and profitable in an orchard upon level country in South Australia, as

it is in other countries, where labor is as dear and fruit is as cheap as it is here, it will have done all that is necessary. If the codlin moth is not suppressed somehow, it will suppress fruitgrowing; and when it is shown that the pest can be kept within reasonable bounds by the adoption of certain methods and precautions, it will be for each fruitgrower to decide whether he will adopt those methods or relinquish all hope of securing any fruit. — GEN. SEC.]

**FRUIT FLY.**—Members wished to know whether any steps were being taken to examine fruit at Port Adelaide, with a view to preventing the introduction of the Queensland fruit fly. The Branch wishes to direct the attention of the Central Bureau to the spread of the pest in New South Wales, and to the fact that a shipment of affected fruit had been destroyed at San Francisco owing to its suspicious appearance. The growers in the Hills dread the introduction of this new pest, and think that every precaution should be taken to prevent its introduction. [The Central Bureau is fully aware of the dreaded nature of this pest, and of its spread in New South Wales, and has already urged the Minister of Agriculture to take all such precautions as may be necessary, without unduly hampering trade, to prevent its introduction into this colony. The fly has already been placed on the list of insects which are prohibited, and the Customs officials have been instructed to keep a careful watch over all fruit coming from the adjacent colonies.—GEN. SEC.]

### Riverton, November 20.

Present—Messrs. D. Kirk (in chair), A. B. Welch, T. Gravestock, F. Chapman, W. J. Andrew, M. Badman, H. A. Hussey (Hon. Sec.), and one visitor.

**AGRICULTURAL CLASSES.**—“Considerable discussion took place on the question of the establishment of agricultural classes in country districts, and a motion to the effect that they were not practicable in this district, failed to meet with a seconder. It was decided to postpone the discussion until next meeting.

## THE “GRANGERS,” OR “PATRONS OF HUSBANDRY.”

This once powerful institution was first organised in Washington, D.C. (U.S. America) in 1866, by seven men, most of whom were employed in the Government Agricultural Bureau. They were O. H. Kelly, William Saunders, Wm. H. Ireland, J. R. Thompson, Rev. A. B. Grosh, Rev. John Wimble, and T. M. McDowell. Its expansion was marvellous. In ten years it had issued charters to 24,290 granges, embracing 763,263 members. In 1888 it numbered 800,000 members, and published at least forty-eight weekly journals in its interest.

The preamble to the constitution of the grange is as follows:—

Human happiness is the acme of earthly ambition. Individual happiness depends upon general prosperity. The prosperity of a nation is in proportion to the value of its productions.

The soil is the source from whence we derive all that constitutes wealth, without it we would have no agriculture, no manufactures, no commerce. Of all the material gifts of the Creator, the various products of the world are of the first importance. The art of agriculture is the parent and precursor of all arts, and its products the foundation of all wealth.

The products of the earth are subject to the influence of natural laws, invariable and indisputable, the amount produced will consequently be in proportion to the intelligence of the producer, and success will depend upon his knowledge of the action of these laws, and the proper application of their principles.

Hence, knowledge is the foundation of happiness.

The ultimate object of this organisation is for mutual instruction and protection; to lighten labour by diffusing a knowledge of its aims and purposes; expand the mind by tracing the beautiful laws the great Creator has established in the universe, and to enlarge our views of creative wisdom and power.

To those who read aright, history proves that in all ages society is fragmentary, and successful results of general welfare can be secured only by general effort. Unity of action cannot be acquired without discipline, and discipline cannot be enforced without significant organisation; hence we have a ceremony of initiation which binds us in mutual fraternity as with a band of iron; but, although its influence is so powerful, its application is as gentle as that of the silken thread that binds a wreath of flowers.

In the "History of Co-operation in the United States," published by the John Hopkins University, Baltimore, in 1888, it is stated that "it was claimed, in 1871, that there were no less than 30,000 local granges in all the states and territories, with a total membership of 2,500,000, of which a large proportion were in the western states. The Order of Patrons of Husbandry still exists, and in some localities is not without large influence. But its chief mission was a temporary one, and has been fulfilled." The most memorable meeting ever held by the National Grange was that of 1874. in St. Louis. The following "Declaration" adopted at the time fairly stated the objects of the order:—

We shall endeavor to advance our cause by laboring to accomplish the following objects:

To develop a better and higher manhood and womanhood among ourselves; to enhance the comforts and attractions of our homes, and strengthen our attachments to our pursuits; to foster mutual understandings and co-operation; to maintain inviolate our laws; to emulate each other in labor, to hasten the good time coming; to reduce our expenses, both individual and corporate; to buy less and produce more in order to make our farms self-sustaining; to diversify our crops, and crop no more than we can cultivate; to condense the weight of our exports, selling less in the bushel and more on the hoof and in fleece, less in lint and more in warp and woof; to systematise our work, and calculate intelligently on probabilities; to discountenance the credit system, the mortgage system, the fashion system, and every other system tending to prodigality and bankruptcy. We shall avoid litigation for arbitration where possible, working together, buying together, selling together, and acting together for our mutual protection and advancement. We adopt it as our fixed purpose to "open out the channels in Nature's great arteries, that the life-blood of commerce may flow freely."

We are not enemies to railroads, navigable and irrigating canals, nor of any corporation that will advance our industrial interests, nor of any laboring classes

In our noble Order there is no communism, no agrarianism.

We are opposed to such spirit and management of any corporation or enterprise as tends to oppress the people and rob them of their just profits. We are not enemies to capital, but we oppose the tyranny of monopolies. We long to see the antagonism between capital and labor removed by common consent, and by an enlightened statesmanship worthy of the nineteenth century. We are opposed to excessive salaries, high rates of interest, and exorbitant per cent. profits in trade. They greatly increase our burdens, and do not bear a proper proportion to the profits of the producers. We desire only self-protection and the protection of every true interest of *our* land, by legitimate transactions, legitimate trade, and legitimate profits. We shall advance the cause of education among ourselves, and for our children, by all just means within our power. We especially advocate for our agricultural and industrial colleges, that practical agriculture, domestic science, and all the arts which adorn the home shall be thoroughly taught.

Several events seem to have led quite naturally to the necessity for this organisation. The country was newly settled, and the population was increasing "by leaps and bounds." Farmers were eager to reach the markets of the world, and they cheerfully voted enormous subsidies, frequently amounting to an assessment of 5 per cent. and more on the value of their property, to secure railway facilities; and when some of the railway companies had not fairly earned the bonus, the farmers resisted payment of the subsidy bonds with the greatest determination. The experiences with the railway companies and several other trading and dealing organisations compelled the farmers to co-operate in opposition to the greed and extortion which was practised upon them, and the grange movement became so powerful that its salutary work will remain for all time.

About 1866 the farmers of the West were generally in doleful circumstances after the war. They were buying in the highest markets, and selling in the lowest. Their farms were mortgaged at extortionate rates of interest. Crops were large, local markets undeveloped, and railroad tariff cut prices down to cost of production. Mixed farming was not practised, dairying and stock-feeding were not yet developed. Crops were often mortgaged long before harvest time, and pressure by tradesmen and mortgage debts compelled the immediate sale of the grain at any price. The credit system put the farmers at a great disadvantage in their purchases. Fuel dealers, grocers, merchants, and all other tradesmen along the lines had one price for their town customers, and a higher price for the farmers. It was a decade of large profits for the so-called "middlemen," grainbuyers, agents for implements and machines, merchants, &c., and especially it was a time of unjust discriminations, and greedy irresponsible enactions on the part of the railroads.

The effect of the grange upon the condition of the farmers was almost instantaneous. Every small centre possessed its grange or lodge, where the women and young people met in council with the menfolk, both to consider all matters pertaining to husbandry and domestic economy. They initiated a ritual with fixed forms and ceremonies under which their business was conducted. Thrift and thorough intelligent methods of cultivation of the land, and economic management of domestic affairs were inculcated. The more advanced farmers and housewives gave others the benefit of their experience and knowledge, and the regular meetings of these 30,000 granges distinctly improved the moral, social, and intellectual life of the whole community.

The direct economic benefits of the organisation were very great, both individually and collectively. The order enabled its members, by co-operation, to sell and buy at the best possible advantage. They had been so dependent and defenceless that it gave them a new sense of dignity and worth to find themselves solicited and sought after. No principle was more strictly enforced than that of buying for cash. All kinds of purchasing and distributing agencies sprang into existence; and farmers became familiar with prices and business methods. Many of the granges established their own stores, agencies, &c., a few of which remain to the present day, under control of the "Farmers' Exchange," an organisation upon a stronger basis which sprang from the work of the grange. Creameries and factories were established in every direction; diversified and rational farming became established; shelters and sheds for cattle and implements were erected on every farm; a spirit of confraternity was fully developed, and whilst the necessity existed, the members hung together "as one man." The grangers induced the Legislature to pass laws dealing with the excessive railway charges, unjust discriminations, and other matters. And when these laws were passed, and States Commissioners appointed to enforce them, the grangers became negligent, deserted their lodges by thousands, and the order was practically disbanded. But the laws were not enforced; on the railways traffic was "taxed all it would bear," despite the laws; and the grangers were again re-organised, with the final result that matters have been adjusted apparently to the satisfaction of all parties. At the present hour the grange is a comparatively small body; but ready at any moment, if occasion should arise, to expand to its former powerful proportions.

The following extracts from a quaint letter written by an old Iowa granger, gives a good idea of the trading methods introduced by the rural granges:—

When the grange started it seemed as though the railroads and traders were getting about all the benefits of the farmer's labor. We were selling corn for 15 cents. per bushel, and paying about 15 cents per lb. for sugar. We were going in debt for carloads of farm machinery, and letting it stand in the fence-corners to rot. So between the extortion of the railroads, the middlemen, and our own wastefulness, we were getting into a bad shape. So, when the grange came, we were ready to join anything that pro-

mised us any relief. One of the obligations on joining was to house our implements and take good care of our stock. Of course everyone knew that was the right thing to do before, but a little discussion of the matter brought it fresh to our minds. and, as "iron sharpeneth iron so does the countenance of a man that of his friend."

Our first plan of co-operation was to pay cash, and offer our whole trade to one man in a town, provided he would sell at a small profit, say 10 per cent. We had no trouble in finding merchants who would agree to that. But we soon found trouble, for other merchants were not going to be outdone, so they would put their goods down below our price, and then some of the grangers would go there and buy. This soon broke up our boycott business. But as soon as it became known that the grangers proposed to pay cash for their goods, we began to receive circulars from Chicago and elsewhere offering to send goods to the agent of any grange, subject to examination before paying for them. Then we began to buy our goods this way—we went at it very carefully at first. Our agent would bring the goods to his house, and then we would meet and examine them, and send the money. But we soon got acquainted with our merchants, and, learning more of the ways of honorable business, we saw they could not afford to cheat us, so we began to send the money in advance and get a little discount, generally enough to pay the freight. In all our trading for the last twelve years I have never known a case where the merchant did not do all that he agreed to. Now this began to pierce our middlemen in a vital part. If he put his goods down below our price it did not hurt us. We had none to sell, but would buy of him, so he had to submit, or go ahead pounding the wind. Then he began to reason the case with us. He said we were building up Chicago and tearing down our own towns by sending our money away to buy goods, and that we ought to keep the money here to help build up our own country. We had to admit that this argument was unanswerable, but that we had been discussing the subject in the grange, and we could not get the idea into our thick skulls why it was so much worse for us to send the money out of the country than for him to; and as to the profits, we had concluded it was much better for the country that we had them than him. As for tearing down the town, we were very sorry for that, and would gladly have it otherwise, but we were too poor now to buy a master; but if he was able to buy one, we would sell him his next batch of apples at one dollar a bushel instead of his sending to Michigan for them at seventy-five cents. I am sorry to say his love of country never materialised. This is about all the experience I have had in co-operation. Although we have no grange here now, our people still keep posted in prices, and buy to the best advantage. Of course the grange never accomplished as much as some expected, yet it did a vast amount of good in introducing the farmer into the ways of business.

From its first initiation, the women of America have taken a deep interest in the work of the grange. It has given an opportunity to the farmers' wives and daughters to develop their business habits, and has done much to relieve the monotony of their daily round of drudgery. The influence of the grange in increasing the social attraction, and mitigating the isolation of American country life, has been most marked and beneficial.

Most of the above facts are gathered from "History of Co-operation in the United States," by the John Hopkins University, and "History of Labor and Machinery," by the Oceanic Publishing Company.









# Journal of Agriculture

AND

## Industry.

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[A NEWSPAPER

VOL. I.

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### NOTES AND COMMENTS.

The weather during the past month has continued very dry, and, though seasonable in the South for haymaking, has caused some injury to the sample of grain in the dry districts. The fruit crop generally will be only fair. Strawberries set well, but the dry, hot weather finished them off very quickly, and the later districts had but a poor crop. Stone fruits are only fair, and the quality will not be too good. Apples and pears, except in a few instances, will only give a medium crop. The summer fodder crops, except in favorable situations, will be very poor unless we get a good fall of rain soon.

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As the fruit export season is rapidly approaching, and the shipping companies are anxious to know the quantity of fruit likely to be shipped this season, so that they can arrange for space, growers are urgently requested to inform the manager of the Produce Export Department at the earliest opportunity as to the number of cases they will have to export this season. There are nine steamers available for shipping fruit, the first leaving on February 24th, and the latest on April 21st. [An article on Export of Apples appears in another portion of this publication.]

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The apple crop of America is estimated to be rather below that of last season, and quite below the average. Only three states, viz., Colorado, California, and Oregon have a full average crop. Taking 100 as the basis of a full crop, the following will show the estimated product of each centre:—Canada, 40 per cent.; New England States, 20; New York State, 25; Pennsylvania, 50; Maryland, 60; Virginia, 70; West Virginia, 30; Kentucky, 60; Ohio, 30; Indiana, 65; Illinois, 90; Michigan, 30; Iowa, 75; Missouri, 80; Kansas, 75; Arkansas, 90; Tennessee, 70; Colorado, California, and Oregon, 100 each.

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The Queensland Fruit and Economic Plant Growers' Association are arranging to hold an intercolonial fruit show, in Brisbane, towards the end of January, 1898. This is in consonance with a resolution adopted at the late Intercolonial Conference of Fruitgrowers at Brisbane, that each colony should endeavor to hold annually an intercolonial fruit show. Doubtless the end of January is a good time for an exhibition of Queensland fruits, but it is rather early for the southern colonies. The Department of Agriculture in Queensland is taking part in arranging for the show above referred to.

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The Spanish Reed (*Arundo donax*), commonly called "bamboo," is a very useful plant on the farm or in the garden. It requires no care, and does not rob the adjacent soil to any extent. The leaves and young growth will serve as fodder for stock in times of scarcity, and the plants make an excellent windbreak. The "bamboos" are useful in many ways where a clumsy, heavy pole would not serve.

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Another very useful plant is the "Tamarisk" (*Tamarix gallica*), or "flowering cypress," which will grow almost anywhere, even on the sand near the sea shore, and upon brackish soils. Most herbivorous animals are fond of the foliage, and the plant will bear lopping severely every year. The stems which spring from the pollarded stem, like the canes of basket willows, can be used for wattle, &c., and make also very handsome walking-sticks when peeled and varnished.

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In Maine, U.S.A., from 1889 to 1891, bounty was paid to the amount of 5,000 dollars for the destruction of 50,707 crows. In Pennsylvania it is estimated that the value of all poultry killed by hawks and owls does not exceed 1,875 dollars in a year and a half. It is reckoned that each hawk and owl kills 1,000 mice per annum, and each mouse destroys 2 cents value at least of the farmer's produce. Again, it is shown that 90,000 dollars has been spent each year for killing birds which would have saved 3,857,130 dollars' worth of farm produce, less 1,875 dollars' worth destroyed by the birds themselves. The crow, especially, is a most persistent enemy of locusts, caterpillars, grubs, beetles, mice, and hundreds of other ravagers of the farm: but he loves eggs, and sometimes eats other things that the farmer would rather keep for himself.

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There are hundreds of insignificant rivulets running to waste in various parts of South Australia, which, if properly utilised, could be made to irrigate thousands of acres of succulent and nutritious fodder for tens of thousands of cows, pigs, poultry, and other stock, adding considerably to the material wealth of the people; but (there is often a "but" in the way) the people lower down on those little rills, so full of wealth, will neither use their advantages themselves nor allow others to use them. Directly an enterprising man endeavors to use the water, someone who perhaps regarded it as a drawback or a nuisance upon his own land begins to talk of "riparian rights," and completely stops his neighbor's progress. These things are now managed better in America, where much the same state of things used to prevail. Such matters as these are worthy of the close attention of most advanced statesmen. The true rights of no man should be interfered with on no account without a just rectification; but the best interests of the whole neighborhood ought never to be sacrificed to the whims of an individual who will not avail himself of the natural advantages of his position, and will not allow others to do so with theirs.

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"White Slavery" is the euphemistic term applied by a few people to dairy work on the farm. Yet many farmers gratefully acknowledge that the cows, pigs, and poultry have often brought in more during the year than all their cereals and hay crops. When the epithet is chivalrously applied to the women folk, upon whose shoulders this disagreeable work is too often thrust, it may be justifiable from the man's point of view; but the other sex prove their title

to being "the better half" by cheerfully undertaking the work and keeping the home over the heads of their husbands and children, when the farmer, with all his land, implements, and labor, fails to make both ends meet. The question may well be asked, "Why should there be any 'slavery'?" The men folk have been driven to co-operate in the establishment of creameries and factories for butter and cheese, and can, if they choose, do away with the drudgery of milking by the establishment of milking machines in centres, to which the cows could be driven a couple of miles, even, to be relieved of their lactiferous burdens.

The worst scale insect at present known to orchardists is the San José scale (*Aspidiotus perniciosus*), often called the "Pernicious scale." It is closely allied to the orange round scale (*Aspidiotus aurantii*), often called "Red scale." Up till within a few months ago it appeared as though nothing short of frequent fumigation with hydro-cyanic gas would keep the pest within bounds; but quite recently it has been noticed that patches of trees which had been badly infested with "Pernicious scale" were free. After long and careful search by skilled entomologists, it was found that a fungus disease had attacked the scale insects and destroyed them. This fungus is known to botanists as *Sphaerostilbe coccophila* Tul. The fungus is found in many parts of the world, and is known to attack various scale insects, although this is the first recorded instance of its attacking the pernicious scale. D. W. Coquillot, in 1892, directed attention to the fact that some kind of fungus probably caused destruction of San José scale, but Dr. L. O. Howard, U.S.A. Entomological Department, now identifies the fungus, and confirms the theory.

The San José scale has been found in three orchards at Wangaratta, Victoria, introduced by the owners with fruit trees purchased from a Sydney nursery. Many of the peach trees are already dead, and a number of pear trees are also badly affected. The owners will be required to exterminate the pest, either by the cyanide process or by destroying the whole of the trees. Several orchards in New South Wales have also been found to be attacked by this dreadful scale, and in every case the owners have introduced trees from one nursery near Sydney. The worst feature of this "Pernicious scale" is that it will live upon so many kinds of plants. The new regulation adopted in Victoria requires that every plant introduced into the colony shall be sent to the Burnley Horticultural Garden, there to be subjected to fumigation with fumes of hydrocyanic gas, generated with sulphuric acid and water into which cyanide of potassium has been thrown. This treatment effectually destroys all insects and their eggs, without injury to plant life if properly and carefully applied.

There is, perhaps, not any consolation in the fact that other people suffer much more than ourselves; but bad as things may be in South Australia, they are much worse in South Africa amongst the farmers. They have to contend with locusts, drought, and a lot of minor evils which have destroyed their crops in many districts, and, in addition to twenty or more diseases of live stock, they have to suffer from the rinderpest, which has scarcely left a beast alive where hundreds of thousands were owned by the unlucky farmers three years ago. American farmers' crops are devastated by innumerable scales, borers, and other insects, by all sorts of parasitic fungi, and by coyotes, wolves, panthers, bears, Indian and other dogs, lynxes, deer, wild horses, foxes, minks, skunks, rabbits,

raccoons, porcupines, various kinds of rats, weasels, gophers, ground squirrels, tree squirrels, chipmunks, field mice, musk rats, moles, hawks, crows, pheasants, and many other birds, quadrupeds, insects, and fungi, besides pestiferous weeds without end. Our Australasian neighbors have many more noxious insects, parasitic fungi, and pestiferous and poisonous weeds to fight with than we have in South Australia. Our droughts are more than counterbalanced by their disabilities, and our heat and dryness is probably more easily borne than their sultry, soggy summer.

The natural enemies of various agronomical pests which keep them in check in their own country cannot always exist in other countries where the climatic conditions are only slightly different. For instance, the "Pernicious scale" or "San Jose scale" (*Aspidiotus perniciosus*), has been almost exterminated in some parts of America by a fungus (*Sphaerostilbe coccophila*), and also in parts of Queensland the same fungus attacks other kinds of scales. The fungus has already been introduced into South Australia, but the climate does not appear to be sufficiently tropical for it, and it perished.

In Ohio, U.S.A., and other states the locust plague is kept in check by a mite allied to "red spider," and named *Trombidium locustarum*. It is said to be more effective than the "hopper dozer," a machine which catches the hopper on a kerosened screen of canvas. When the hoppers first hatch they are as small as fleas, and congregate in masses. From then until they can fly they do most damage; and until they fly they can be most easily dealt with.

In France, Germany, Switzerland, school children are practically educated in rural pursuits. They not only grow vegetables, fruits, and flowers, but in some schools they rear pigeons, rabbits, keep bees, and learn many things which give them a real live interest in agronomical industries, and are practically useful to them and their native land when they grow up. In some parts of England a move has been made in this direction. In South Australia many of the public school teachers have taken up "agronomy," and the Public Schools' Floral and Industrial Societies' annual exhibition each year shows advancement in this direction. There is room for a very great extension in the matter of education in rural industries. The local Agricultural Societies could help by giving gardening tools, books, &c., as prizes for vegetables, fruits, flowers, poultry, rabbits, &c., reared by children attending their public schools. They should never offer money prizes.

Indiarubber is at present in great demand, and, unless some substitute can be found, will become extremely scarce. Naturally there will arise a desire that rubber-producing trees shall be cultivated; and it will be well to bear in mind that these trees can only be successfully grown in a tropical climate, where the temperature does not fall below 86° F., and where 60in. to 80in. of rain is the annual average. The Northern Territory of South Australia would probably serve admirably for the cultivation of *Jatropha elastica* and several other rubber and gutta-percha trees.

## THE RAMIE, OR RHEA.

There is at present considerable excitement about ramie cultivation, and it would be a good thing to remember that this plant will thrive only in a semi-tropical climate, and where there is a considerable rainfall. It is well suited, for instance, in our Northern Territory. Ramie plants will survive temporary exposures to flood or drought, but cannot withstand frosts. Although it has been cultivated from times prior to the Pharaohs in Egypt, and still longer probably in China, the difficulty and cost of separating and manufacturing its fibre has prevented any but the cheapest kind of labor entering upon the industry. Nearly fifty years ago an Englishman, John Marthall, of Leeds, invented a cheaper and more expeditious method of treating the fibre, and exhibited in 1851 at the Great Exhibition a surprising variety of beautiful fabrics manufactured from ramie fibre. Since then several improvements have been made upon his methods, and now there is a great possibility that the cultivation of *Böhmia nivea*, or Chinese grass-cloth, in suitable climates will well repay the labor of Europeans. The fibre is of varying qualities in different layers of the bark, and by careful selection and manipulation can be used for ropes and cables of greater strength than Manila hemp, or for fabrics finer than the best linen, or for lace, or plush, or velvet, damasks, brocades, &c., excelling in strength, fineness, and finish nearly every other known fibre. Ramie is combined with silk, cotton, and linen, and adds greatly to their strength, beauty, and usefulness. Handkerchiefs, cravats, hosiery, camlets, cambries, shawls, alpacas, carpets, &c., are all improved by admixture of ramie fibre with the fabrics of which they are usually made.

Systematic attempts have been made during the past fifty years to introduce the cultivation of ramie into many countries, many of them unsuited in climate. India in 1865 exported about 70,000,000lbs. of ramie to England, but the natives did not take kindly to the new industry. South America, Sandwich Islands, Northern Africa, and several places in Southern Europe have at times taken to ramie-growing. French capitalists started plantations in Egypt, Spain, and Algeria, and some satisfactory results followed. Attempts have lately been made to arouse an interest in the cultivation of ramie, and it is to be hoped that the industry will be given a fair trial in localities where the climate is favorable and the soil is suitable. Plants are struggling for existence in the open grounds of the Adelaide Botanic Garden, which should be sufficient evidence that our climate is neither hot enough nor sultry and moist enough for successful growth of the ramie.

## POULTRY.

By D. F. LAURIE.

### Varieties.

Our colony is large, and some portions are better suited for certain breeds than others; again, although certain breeds are pre-eminently suited for the export trade (as breeders of table poultry), there are many others which if kept in their purity are excellent for many purposes, and at the same time ornamental. I propose, therefore, to give a list of the best known breeds, their general color, and utility points.

### Fowls.

The Ancona, a black-and-white mottled bird of the Spanish type, an excellent layer, non-sitter; but has not much to recommend it on the score of beauty.

The Andalusian, a very handsome bird, of similar build, but now bred more

gamey in type; color, slate-blue with dark markings. When bred to perfection they are very showy, non-sitters, and excellent egg producers.

The Brahma is more bred for fancy and show than for utility. There are two varieties, the dark and the light. As table fowls they are poor, having yellow flesh of poor quality; they lack breast, and are not shapely on the dish. Excellent table fowls result from a cross with the Dorking or Game. Some strains lay well; they are prone to sit, and make fair mothers.

Cochins are bred in the following colors:—Black, white, buff, cuckoo, and partridge. As show birds they are very handsome, generally lay well in the winter; are very prone to sit, and make good mothers. They take a back seat as table fowls, pure or crossed.

Crève-cœurs, a French variety, little known in Australia; they are handsome black fowls, of excellent quality for the table, and well worth introducing.

Dorkings, of which we have the following colors, are all of the highest value as table fowls, they also lay well, are excellent sitters and mothers:—They are to be had as silver-greys, colored, white, and cuckoo. The Dorking is highly ornamental, and is invaluable for crossing with many other breeds.

The Dominique, a barred-grey fowl, similar in color to the Plymouth Rock, is a breed of American origin. They are fair layers and table birds, and are good sitters.

Frizzled fowls are attractive to some, but beyond their curious plumage they have little to recommend them either to the fancier or utility breeder.

Game are to be had in numerous varieties, and may be divided into Old English, Modern, and Indian. Of the former numerous varieties are bred, those with white feet and legs are most esteemed for table purposes. They are as a rule excellent layers, and of the finest quality of flesh. The modern game is more of a show bird, its great length of leg telling against it for table purposes; still the flesh is perfect, and the hens lay well. As in the case of the old English the colors are numerous, but the best known are Black-reds, Brown-reds, Piles, Duckwings, Whites, and Birchens—there are numerous others.

In Indian Game we have only one variety; this bird is of great value for crossing with Dorkings for the production of high-class table fowls. Many strains lay fairly well. One of the most popular breeds.

Hamburgs are perhaps the most ornamental of all fowls; they are non-sitters, and lay perhaps more eggs for a given quantity of food than any other breed. The varieties are the gold spangled, and the silver spangled; two pencilled, the gold and the silver; and the black.

The Houdan is sometimes called the French Dorking, a fine square-bodied fowl, black and white in color, of delicate flesh; a non-sitter, and an excellent layer; has a large topknot, and, like the Dorking, five claws. This breed is well worth cultivating, and does well on the Murray.

Leghorns, like all Mediterranean breeds, of the Spanish type; they are non-sitters, and splendid layers. They are bred in the following colors:—Black, white, brown, buff, pile, cuckoo, and duckwing.

Langshans properly are of the one variety only, the black; still the club in England recognises the white and blue. The Langshan is an excellent all-round fowl, a good layer, especially in winter, an excellent table fowl pure or crossed with Game or Dorkings, a good sitter and mother.

La Flèche, a French bird of good all-round qualities, but not bred in Australia; well worth a trial; it is black in color.

The Minorca, either black or white, is at the head of all laying birds, and crosses well with the Langshan.

Malays are bred in similar colors to the game. They do not rank highly as layers or table fowls as they are coarse, and not equal to Indian Game for crossing.

The Orpington, a breed of recent days, is much in favor at present for all-round purposes. They lay well, are good table birds pure or crossed. We have the black, white, and buff; both single and rose combed.

Polish are bred more for show than ornament, although as a rule they are good layers. They are crested birds, and are to be had in the following colors:—Black with white crest, silver spangled and golden spangled.

Plymouth Rocks, of which there are two, the barred and the white, are highly esteemed in America for table purposes. They carry a lot of good meat, but it is tinged and the skin is yellow. They are good layers, sitters, and mothers.

Royal Blues, a Victorian breed, are said to be excellent for table and laying, and are forging ahead.

Spanish are fair summer egg-layers, but are delicate, and of no value for the table.

Wyandottes are bred in many colors, the gold laced, the silver laced, the white, buff, and partridge. They are all excellent layers, and crossed with Indian Game produce splendid table fowls. They mature very early, and, in addition to being very handsome, are grand all-round birds. In the foregoing the principal varieties of the best known fowls have been briefly referred to. It would be a big undertaking to give an accurate description of each kind, still one is able to form a fair estimate of the value of each breed.

### Ducks.

The Aylesbury, a pure white bird of great size and splendid table qualities is at the head of all breeds. It is a fair layer and matures quickly.

The Pekin is white, with a distinct canary under color. A large bird, which thrives well here, and crossed with the Aylesbury gives a splendid table bird.

The Indian Runner, a small duck of excellent quality, famed for its enormous egg production. This breed will be of great value for crossing, as the average of eggs laid will be much increased by the introduction of this blood. The color is fawn and white. They mature very rapidly.

The Rouen is an old favorite on account of the superior quality of its flesh. It is large, and a fair layer; still, on account of its dark plumage, any remaining stubs or quills detract from its appearance when dressed. The duck is rich brown and dark markings, the drake a mixture of claret, grey, and green. They are exceedingly handsome.

The Cayuga is a medium-sized black duck of great excellence of flesh. It is not bred to any extent, but is worth a trial for its quality alone.

The Muscovy is large, but, unless eaten young, is coarse and of rank flavor.

On the whole the three first-named, pure or crossed, are to be recommended. The table duck of the future will be bred from a bird resulting from a cross between the Indian Runner and the Aylesbury, bred back again on to the Aylesbury.

### Geese.

The largest and best known in Australia is the Toulouse, a bird of enormous size. Mr. Briggs, of Victoria, had a pair weighing 63lbs., and another pair at Geelong weighed 58lbs. These birds were not fat. Color, grey and white.

The Embden is little known here; there are some good specimens in Victoria, which run the Toulouse close for size. The color is white.

The China goose (either the white or the brown) is a small variety, but excels as a layer; for family use they are excellent, and of good flavor.

The Toulouse breed is to be recommended. An introduction of this blood would do much to raise our common geese from their present miserable condition as regards size and quality.

### Turkeys.

The American Bronze Turkey has been proved the most suitable for breeding for market. I have seen birds of 45lbs. weight and upwards in Victoria.

Other breeds are Norfolk Bronze and White Cambridgeshire, smaller birds, but of very fine quality of flesh.

### Pintados.

The Guinea fowl should be bred to a much greater extent; they are easy to rear, and, besides destroying large numbers of insects, are harmless in a garden. The flesh is excellent.

Specimens of all the above breeds and their varieties are procurable now. Of course this general description refers to pure-bred birds. As regards laying, this is a matter of strain more than breed. When a bird is said to be a good layer, the general characteristic of the breed is referred to.

### Summer Treatment.

A little Epsom salts—a packet dissolved in hot water to mix with the soft food for a dozen adult fowls—may be given once a fortnight during the summer months.

## NOTES ON VEGETABLE-GROWING FOR JANUARY.

BY GEORGE QUINN.

Further than making the successional sowings of beans of all edible podded kinds, and salad plants in very cool-shaded spots, very little outdoor planting or sowing can be done on the plains.

Seed-beds should be prepared for raising young plants to put out in the late autumn.

A good way is to dig out a shallow pit by throwing out the first spit or spade depth, thus bringing the surface of the bed a few inches below the ground level; the soil is then well broken, or if poor thrown out and replaced by a fairly rich clay loam; this tinge of clay is very useful in causing the soil to adhere to the roots of the young plants, when they are being transferred to the open beds later on. After sowing the seeds, cover them evenly with pulverised or sifted manure, after which a good soaking should be given with a finely rosed watering-pot. The sides of the pit should be kept up by boards or palings on edge, and the best covering is a lattice made of split palings nailed to a skeleton frame.

A very important point is to make the surface of any such pits perfectly level to prevent the water running down, and washing the seeds or manure all to one corner. As the month proceeds a sowing of cabbage, cauliflower, and celery may be made in this manner.

All of the melon tribe will require abundance of water, and, where it is practicable, a good supply of weak liquid manure will assist matters. Do not allow the water to splash upon these plants while the sun is shining upon the leaves, or they will dry in patches. If the runners from pumpkins be covered at intervals with manure or soil, roots will be thrown out, and thus relieve the central stem.

The liquid manure should not be poured upon the stems or leaves at any time.

Harvest onions carefully as suggested in December notes.

Potatoes that have not yet been harvested should be attended to without delay, or caterpillars will ruin the tubers.

Tomatoes will be growing strongly and thrive best if the soil be broken up



thoroughly after each soaking, which by the way should not be given too frequently. The plants should be tied up at intervals to keep the fruit out of the dirt. In cool damp gullies in the hills operations similar to those of last month will be continued. In every instance, where manure is procurable, much better results will be obtained by mulching the surface about all growing crops. This not only prevents evaporation, and saves money for water, but it keeps the soil more evenly cool and moist, thus permitting root action to go on uninterruptedly, a result which cannot be obtained by any other means in this dry climate, and in dealing with most summer crops the chief aim is to maintain strong growth, and thus evade the attacks of thrips, which are the bane of all growers of summer vegetables upon the plains.

## THE EXPORT OF FRESH FRUIT TO LONDON.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

Prior to the establishment of the Government Produce Export Depot the exporting of fresh fruit to London was carried on in a desultory way by individual growers, with extremely varied success. The returns from one shipment would be promising, but the results of the next would crush the high hopes of the plucky orchardist to the ground. Sometimes the rough handling at this end would be blamed for the loss. At others the want of proper ventilation and storing aboard ship would each come in for their volume of abuse. It cannot yet be claimed that these evils are altogether adjusted, but claim can certainly be made that a system of proper supervision of handling, regularity of shipment, with prompt attention and disposal at the other end has been inaugurated. Uniformity of packing and the use of cases of regular sizes are being rapidly achieved, which must be admitted will aid greatly in the solution of the stowage and carrying problem.

The experiments of the earlier shippers have helped greatly in the choice of varieties that will not only stand the voyage best, but which will also sell best in the London market. Seizing upon the information supplied in this direction by our first exporters, and the experiences of fruit shippers in the other colonies, the Agricultural Department a few years ago disseminated broadcast amongst the orchardists the names of certain varieties that could be reasonably expected to yield fair returns from London. The result has been that within the last five years large numbers of these sorts have been planted. Many of these are now coming into fair bearing, and it can be safely inferred in the case of apples that within the next five years, should the orchards receive proper attention, the output in any season of the past will be doubled if not trebled in this colony. Unless some extraordinary development takes place to increase our consuming population, or other destructive pests or diseases in the trees intervene, the local markets will be glutted beyond description with this fruit, so that either the maintenance and enlargement of our export trade must go on without check, or many orchards go out of cultivation, and the owners be involved in loss for the time spent in rearing them.

Up till very recent years our growers of fruit realised large profits in local or intercolonial markets; but as experience has shown that vast areas of this and the adjoining provinces are admirably adapted for growing fruits of various kinds, the profits have narrowed down. It did not pay to export apples when local prices ranged above 5s. a bushel, no more than it paid to dairy farm when large crops of wheat realised that figure; but the lesson of last season's abnormal yield will, I think, have a salutary effect. The apple crop of 1897-8 does not promise to be a large one, which is almost a natural sequence to that of last season.

Last year 10,813 cases of apples were sent through the dépôt to London, the returns averaging about 8s. 6½d. per case there. From this has to be deducted the following charges:—

	Per Case.	
	s.	d.
Freight in cool chambers.....	4	3
Lighterage from dépôt to steamer.....	0	3
Dépôt charges, including bills of lading and insurance.....	0	4
Branding and supervision of handling to prevent bruising.....	0	3
London charges, including landing, wharfage, cartage, expenses of brokerage and guarantee, at 5 per cent.....	1	1
To this must be added—	6	2
Cost of case.....	0	11
Paper for wrapping, labor for packing, and transport, say.....	0	9
Total.....	7	10

It will naturally be asked, "If it costs 7s. 10d. to land and sell the case of apples in London, and it realises 8s. 6½d., where is the profit in 8½d. for a bushel of the fruit?" For an explanation of this I would refer our readers to the accompanying list, where it will be seen that, out of forty-eight varieties sent, fourteen sorts, totalling 666 cases, did not return expenses. It is gratifying to find that the four varieties most largely exported, viz., Cleopatra, Dunn's Seedling, Strawberry Pippin, and Stone Pippin, of which 6,863 cases were sent, averaged in London about 10s. 10d. or 3s. per bushel net to the exporter, which was from 6d. to 1s. more than he received here during the same period. The numbers of cases and average returns of these sorts were respectively—Cleopatra, 4,435 cases, 10s. 9½d.; Dunn's Seedling, 850 cases, 11s. 9d.; Strawberry Pippin, 771 cases, 9s. 9½d.; Stone Pippin, 807 cases, 10s. 8½d. Many other varieties from some districts, including Lady Henniker, Fearn's Pippin, Peck's Pleasant, Garibaldi, Ribston Pippin, King of Pippins, Blenheim Orange Pippin, Raspberry Pippin, Mac's Red, Sturmer Pippin, and Jonathan, gave good individual returns, but the numbers exported were limited in comparison to the foregoing sorts. The greatest disappointment has been expressed at the sales of Rome Beauty, Jonathan, and London Pippin, but some large growers are still confident that these will in future hold their own.

The publication of this table of returns should not only be very useful in determining the sorts to export, but should aid in the selection of the sorts suitable for different districts and climatic conditions which rule in various parts of this colony.

Many complaints were made last year respecting the packing capacity of the present export case, which measures outside 28in. x 13in. x 9in. It was urged that only medium-sized fruits packed in it readily, and the large and very small were left over, which formed an unsuitable sample for local market purposes. To meet this difficulty a case devised and used last year by Mr. C. Pitt, which measures outside 28in. x 10in. by 11½in., is suggested as being suitable to pack larger samples. The cubic contents are very nearly the same as those of the case now in use, and I would suggest to exporters that they procure such a number of this size as will assure them against having the larger fruits left upon their hands.

As will be seen by the printed returns, the exportation of pears has not been a success. Most of those forwarded have been packed in a similar manner and in the same sized case as the apples. Now, this is against the experiences of pear-exporting countries. Pears, unlike apples, will not stand pressure, and the pressure that will only dent in the skin of an apple will crack that of a pear and start it decaying immediately. Pears are sent from France all over Europe packed in boxes only of sufficient depth to take one layer of fruits. The individual fruits are wrapped in tissue paper and are very securely packed in wood wool—parcels of this may be obtained for experiment at the Agricultural Department—in such a manner as to insure the fruits from

rubbing against the sides of the case or the adjoining pears. Seeing that Mr. D. Murray has sent them home successfully in this manner, even after aggravating delays at this end during hot weather, and that those arriving home in good condition have realised up to 21s. per case, it is worth while persevering with this luscious fruit. The sorts which I know to have sold at high figures have been Glou Morceau, Josephine de Malines, Vicar of Winkfield, Winter Nelis, and Bergamotte. A very suitable case could be made by simply sawing our present export cases down the centre lengthways, giving the proportions of 28in. long, 13in. wide, and 4½in. deep outside measurements. I do not think we will succeed in obtaining good results with pears if packed in large cases and without abundance of elastic padding, and for this purpose the wood wool is superior to the paper shreds, as it will not collapse into a sour pulpy mass if slightly moistened by condensation. About 6ozs. of wood wool is required per half-case of the size at present in use.

Grapes of three varieties have been successfully sent to London. The well-known Doradilla has sold as high as 20s. per case, which contained about 1s. 3d. worth of fruit from a local valuation, but other consignments have sold for 3s. per case, and thus the average falls to what we see in the accompanying lists, viz., 10s. 3½d. It will take from 4lbs. to 5lbs. of granulated cork to pack a case; this is worth about 3d. per pound, so that it must be reckoned that a case of grapes will cost at least 9d. more to pack than a case of apples, even when the absence of wrapping papers is counted. As examiner of fruit at Port Adelaide, it seems to me that there has always been insufficient care shown in packing the grapes.

In the first place too much fruit and consequently too little granulated cork is placed in the cases. I would suggest that the cases be lined all around the interior with a thin layer of wood wool, and then abundance of granulated cork be placed between the berries and layers of fruit, dumping the case gently as the packing proceeds; then when the top is reached put another layer of wood wool prior to nailing down the lid. My reasons for suggesting this method are that in the past the berries invariably work through the cork grains and rub against the wooden sides of the case by the time they reach the Port Adelaide Dépôt. The layer of wood wool would prevent this, and at the same time conduct such ventilation as is necessary. Doradillas should not be too "browned"—a sign of over-ripeness—but should be quite firm to the touch. Shouldery and dense bunches should be thinned out with long scissors, so that the cork grains may percolate between the berries, and the bunches rest evenly and firmly upon each other. These precautions are unnecessary with the so-called Red and White Daira or Almeiran varieties.

The other varieties proved a failure. One great essential in a packing grape seems to be toughness of stem as well as skin. Many grapes keep pretty well, but they fall from the strigs, and of course open the avenues of decay at once.

Of quinces we need not speak; markets are limited, and the results have been disappointing, involving the exporters in considerable loss.

In conclusion, I wish to mention another phase of the subject. This season we will probably only have a moderate surplus for export, but having now opened up an avenue for the disposal of our fruits, and made a favorable impression with them—apples in particular—we should keep that avenue open continuously, even though the returns may be no more than can be secured locally during this coming season. Last year our supplies came upon the English consumers ere they had recovered from the cheap glut of 6,000,000 bushels of American apples, and one does not care to give advanced prices for a fruit which has been in season for months. This season, according to latest horticultural files, the prospects for our exports are better, as the English apple crop has been a comparative failure and the American output will be about 80 per cent. below an ordinary crop.





## PRODUCE DEPARTMENT.

Mr. R. W. Skevington, Inspector under the Fruit and Drugs Act, has also been appointed Manager of the Produce Export Department, and entered upon his new duties at the commencement of December, 1897.

### EXPORT OF APPLES, ETC.

To facilitate the export of fruit to the London market, the Produce Export Department furnishes the following information and recommendations to growers and packers for the coming season.

#### Size of Cases.

With a view to economising space in transit, it is very desirable that the cases should be of a uniform size and shape, and the experience of the last three seasons together with the highly satisfactory prices obtained lead to the conclusion that the dimensions of the cases most suitable for export purposes, and also which is most acceptable to the London buyers, are as follow :—For ordinary size fruit, inside measurement 26½ in. long, 12 in. deep, 8 in. wide; for larger size fruit, inside measurement 26½ in. long, 9 in. deep, 10½ in. wide, with a partition ¾ in. in thickness across the centre.

The top and bottom of the case to be in solid pieces; the sides to consist of four laths each 2½ in. in width, with spaces between, and a batten measuring ½ in. by 1½ in. by 12½ in. in length nailed across one side of the case on each end, so that when the cases are placed in the ship's cool chambers, spaces will be left for a proper circulation of cold air.

Sample cases can be seen at the Produce Export office, and the prices quoted by local timber merchants for the timber in shooks, at Port Adelaide, is approximately 80s. per hundred or 88s. 6d. made up.

#### Paper for Wrapping.

Each apple must be wrapped in a piece of tissue paper; a supply of suitable paper ready cut, and suitably printed, will be obtainable at the Produce Export office for the cost price of the paper only. Shippers may have their names, &c., printed on the outside of the dépôt brand.

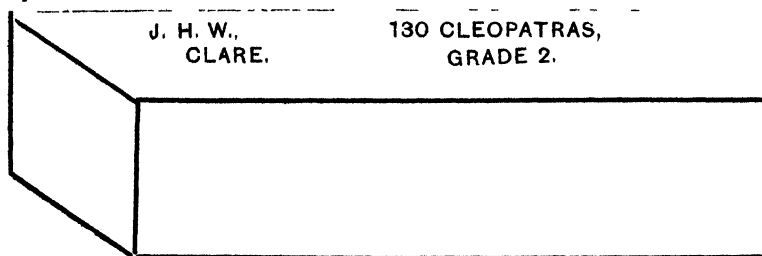
#### Packing and Grading.

This is the secret of success, and it cannot be too strongly impressed on intending shippers, the absolute necessity of selecting large sound fruit for shipment to London, and of packing in each case fruit of the same size, no apples being less than 2½ in. in diameter; large and small apples should never be packed together. Each packer should endeavor to gain a reputation for his fruit; buyers soon find out a brand which is always of good and uniform quality. Pack firmly, but not too tight. Every faulty apple should be discarded. Paper clippings form the most suitable material for packing and filling up the spaces, these can be obtained from the bookbinders and wholesale stationers in Adelaide at a low cost.

#### Branding.

Each case should be branded on the *lid only* in the following manner :—On the left-hand corner the cases should be branded with the owner's name, or initials, or device, and the locality should be printed beneath. In the right-

hand corner the number and variety of apples contained in each case should be printed distinctly, and beneath the grade or quality may be printed; as, for example—



By adopting the above plan, a considerable amount of trouble would be saved in London, and the fruit appreciated in value accordingly.

### Regulations for Receiving at the Export Depot.

Fruit for export must be sent for examination to the Export Depot, Ocean Steamers Wharf, Port Adelaide, at least five clear days before the date of sailing of the vessel by which it is intended to be shipped.

The mail steamers leave the anchorage for London every Wednesday, between February 24th and April 21st of 1898, therefore all fruit should be delivered at the depot on the previous Thursday.

The depot is open on Mondays to Fridays from 7 a.m. till 4 p.m., and on Saturdays till 12 noon.

## FRUIT EVAPORATION AS AN INDUSTRY.

*(American Cider and Vinegar Maker.)*

The evaporation of fruits on a large scale is an industry that has grown enormously in the past few years and one that directly concerns the farmer and fruitgrower from a commercial point of view. Old-fashioned dried fruit does not bring the prices in the markets now that evaporated fruit does, and farmers who wish to preserve their fruit for the market in this way must adopt the new methods. The question whether the markets will be glutted with evaporated fruits is one that the future will have to decide, but at present there is as much, if not more, money in evaporating the fruits than in selling them green. This is especially true of sections of the country far removed from good markets. Fruit in such places is left to decay on the trees, and the loss in this way is enormous.

The principal fruits now evaporated are apples, peaches, and raspberries, as these seem to have the greatest demand and pay the grower best. These are prepared for market by drying in the sun, in kilns or ovens, and by steam and hot air. The latter process is the most successfully pursued by large evaporators. The hot-air process preserves the fruit in a most natural condition, and dries the inside while the outside is left moist. The sugar of the fruit is retained also, so that the sweetness of the peaches or apples gives the peculiar flavor noticeable in green fruits. For this reason evaporated apples command the highest prices in the market. This is self-evident to the least intelligent.

In a good hot-air evaporator currents of dry, warm air are constantly being passed all around the fruit, and these currents of air dry the fruit more than the heat. The faster the air moves in the chambers where the fruit is placed

for drying the less will oxidation take place. Oxidation is the process which causes the outside of the fruits to lose their natural color. In order to prevent this discoloration the fumes of sulphur are passed over and around the fruits immediately after paring. This prevents oxidation, but covers the fruits with a dangerous poison. This, however, is all removed by the process of evaporation. The hot-air currents take away every particle of sulphur on the fruit, and leave it harmless, white, and natural in color. Many condemn sulphuring fruit, but if performed in this way just before evaporation there is no danger whatever.

A hot-air tower for evaporating fruits can be built all the way from \$100 to \$1,000, according to its capacity. A large machine built through the co-operation of a number of fruitgrowers is likely to pay better than a small one for a single family. In order to make it pay it should be used continually, and one farmer cannot keep it going. A large machine will have a capacity of 800 bush. of apples a day. The apples and other fruit used should be pared and sliced by the same power that operates the machinery. The extra cost is small, and the labor saved tenfold. A good machine will pare the fruits, trim them, convey them to the sulphur bleacher, slice them, and prepare them generally for the hot-air tower, where they evaporate. In such an evaporator nothing is lost. Even the cores, skins, and chops are dried and sold at a nominal sum in the market. Chops usually consist of small apples that are sliced and dried without paring. The chops, skins, and cores ought to pay the running expenses of the evaporator.

The question of whether it will pay to put up an evaporator depends upon many things. If fruit is abundant, and the market in the green state small and unprofitable, it will pay a handsome profit to erect an evaporator. The co-operative plan, however, is more successful than individual effort. It requires one man with skill and experience to run the evaporator and to watch the markets closely so as to know how and when to sell.

## EVAPORATED VEGETABLES.

A recent issue of the *San Francisco Call* states that a new and important industry has come into existence in Santa Clara, which bids fair in time to rival fruit-drying. This is the preparation of vegetables, at present confined to the short seasons at the dryers, between the ripening of the various fruits. The principal vegetables dealt with are onions, potatoes, and carrots.

In South Australia evaporated or desiccated vegetables have been exhibited during many years past, but no considerable trade has sprung up, notwithstanding that the articles were highly meritorious. Mr. Spawn, at the Intercolonial Exhibition in Adelaide, showed desiccated vegetables, fruits, and meats of several sorts, and also showed the machine in practical operation. It was about 10ft. high, and 8ft. wide each way, with glass panes in the upper part, through which the interior could be inspected. A stove at the bottom supplied a considerable amount of heat to the interior, and all the smoke was conveyed outside by means of a flue. The articles to be evaporated were placed upon wire-net trays thinly, and these trays were hung upon the arms of a horizontal revolving wheel, similar to the beaters of a stripping machine. This wheel was revolved by aid of a handle outside, and was turned a foot or more every two or three minutes. The trays nearest the stove, of course, got the greatest heat; but by occasional shifting each tray in turn came nearest to the stove. The trays were swung upon wire bridles attached to iron bars extending between the arms at each end of the revolving wheel or spindle. The time occupied in drying was ruled by the article to be dried. Some things required four to eight hours' exposure, whilst others were finished within two or three hours. It was considered to be most important that



articles should be removed directly they were ready—when quite flexible, and just when no moisture could be squeezed out. If left till the fruit or vegetables became brittle the articles were spoiled.

Mr. F. A. Pulleine, Lobethal, has made himself a name throughout the colonies for his desiccated vegetables and fruits; and, although several others are in the habit of evaporating fruits on a large scale, and make a first-class article, he is the only one, so far as we know, who deals with vegetables during the off season for fruits.

The colonists at Coonawarra (late Penola Fruit Colony) have been urged time after time to enter upon the industry of evaporating vegetables, and several feeble attempts have been made to organise for that purpose. They possess special advantages and facilities in this direction. They have a large area of newly-planted orchards, and a soil and climate unapproachable elsewhere for the growth of vegetables. The land is very rich, and water can be got anywhere at about 10ft. The market in the West alone could have taken all that they could have produced, but there is also an opening in the interior for a large quantity.

Carrots, parsnips, and potatoes are reduced to about one-eighth part of their original bulk and weight; onions are brought down to one-twentieth part. Reduced thus in bulk and weight, vegetables can be transported to distant parts at a very moderate cost; and they will keep perfectly good for two or three years. When required for use, the articles are soaked in five or six times their weight of water for twenty-four hours, when they are ready for cooking like fresh vegetables.

## ORCHARD NOTES FOR JANUARY.

By GEORGE QUINN, INSPECTOR OF FRUIT.

With the exception of transplanting an occasional citrus tree, and breaking up the surface of irrigated lands, there is not a great variety of work to be done in the orchard during this month outside harvesting fruit; and it is well that such is the case, for the fruits produced here come rapidly crowding after each other in ripening, and the orchardist is frequently at his wit's end to know how to handle his various crops. Up to the present there has been nothing out of the ordinary in the quantities of any kind of fruit harvested. Strawberries and cherries have been comparatively scarce, and good prices have ruled. Apricots are not going to be so abundant as was surmised a few weeks ago, for it is only within a small radius of Adelaide that the yield will be heavy, and there is a probability of fair prices being obtained for good samples, which owing to the continued drought, are not likely to be in the majority. Peaches will not be plentiful, and excepting on irrigated or favorable spots the quality will be below the average.

Early pears and apples will be marketed, and care should, for obvious reasons, be exercised in picking out codlin moth infested specimens prior to sending the cases out of the orchard.

Orchardists residing in clean districts should insist on all old fruit cases, whether they be sent for the purpose of being filled with apricots, peaches, or any other fruits, being disinfected before leaving a factory or packing-shed which is located in a district infested by codlin moth.

Great care should now be taken to examine the bandages around all trees once each week, and destroy all infected and fallen fruits; at the same time the ground beneath the trees should be kept quite free of anything in which the larvæ might hide.

The summer pruning of apples, pears, and peaches will be undertaken during this month. The method which has been used with success here has been to break the shoots over the edge of a knife, and allow them to hang. Do not sever the shoot by a clean cut; if it be taken off completely the clean wound would heal, and strong growth start again; but if the shoots be broken, say above the third to fifth bud, the result will be the formation of small stubby growths which will eventually become fruit-bearing spurs. By this method most trees of the sorts named above can be clothed in fruit-spurs almost to the ground. The time to do this in various localities can be best ascertained by a knowledge of the seasons only, because it is performed when the rank growth is over, and when only such growing power is left as will be sufficient to send out these short spurs. This is summer-pruning to promote fruitfulness, and quite distinct from the method advocated in a recent issue for shaping the young trees.

Budding may be carried out upon pretty well all kinds of trees now, the only essential being that the sap is circulating freely. The buds put in now may remain dormant after uniting with the stock, unless the stems above the inserted buds be severed at once on the "take" being ascertained: but, unless some special object is in view, the dormant bud is to be preferred to the weakly growth which often takes place from a bud started late in summer.

As one who is desirous of seeing the fruit industry advance, and our own consumers being supplied with good fruit at different times of the year at prices more in keeping with those received by the grower, and in such quantities as I think it should be consumed in a climate like ours, with beneficial results to both user and producer, I wish to urge upon all our readers the importance of mastering the simple rules applicable to home-canning of different fruits. The preservation of most of our fruits by means of canning or bottling is an extremely simple process. The apparatus required is found in most kitchens. A preserving pan in which to stand the vessels containing the fruits, and the vessels, be they glass or tin, with a stewpan or saucepan in which to make syrup. The fruit must be ripe but not mushy.

Stone fruits, with the exception of cling-stone peaches and plums, are halved, stoned, and wiped carefully to remove any foreign matter or woolly substances from the skins. Apples and pears are peeled, cored, and quartered. They are then packed in the tins or bottles. These are then stood in the preserving pan, which is filled with water to about 1 in. from their tops. The bottom of the pan should have some thin framework spread over it, on which the tins or bottles stand, to allow the water to pass beneath, and straw or cloths should be placed between the bottles to prevent injury. The water is then brought to a boil in the pan; the time of boiling entirely depends upon the sort of fruit and the ripeness of the same. Soft apricots and peaches only require about three minutes, while pears and apples will take from fifteen minutes upwards. This is entirely a matter of experience, and every beginner should make a note of the stage of ripeness of the fruits and the time given in treatment, so as to profit by it in coming years. When the cans are packed in the preserving pan, a stewpan or saucepan should be used in which to prepare the syrup, which can be made any degree of sweetness, according to taste; but from 2 lbs. to 4 lbs. of sugar (crystals) to the gallon of water is ample. When this is dissolved, it is poured boiling hot into the cans or bottles of fruit, and then a little longer boiling is given—depending upon the circumstances of ripeness, &c., stated above—before the lids are pressed down finally.

Although a majority of the patent tins are airtight, it is a safe plan to melt a little wax around the rims to insure exclusion of air. For this purpose bees-wax is preferable, because, should any find its way into the fruit, it is harmless in every way. To preserve the color, apples and pears should be thrown into

a basin of clean water immediately they are peeled and quartered. There is no reason why every householder in this colony should not put down in this manner at least one bushel of some kind of fruit each year, and not feel the expense, while the growers of fruit would be largely benefited thereby. Anyone desiring further particulars should procure a pamphlet on this subject from the Central Agricultural Bureau office.

## THE VINEYARD.

### NOTES AND HINTS FOR JANUARY.

*Written for the "Journal of Agriculture and Industry."*

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

There appears to be every prospect of another early vintage, and, I am afraid in our dryer districts, of a badly-ripened, shrivelled crop, unless we are favored with a thunderstorm during the course of the month. Everywhere, so far as I have been able to notice, where rational methods of cultivation prevail, the old vines are holding out manfully against the protracted drought; so far as foliage is concerned, they show as green and healthy as ever. Unfortunately, the same may not in all cases be said of the fruit. In many vineyards, particularly on trellised vines that are over heavily laden, the berries have lost their natural bloom, and assumed that bright glassy appearance that forebodes no good. In the damper districts no signs of distress can yet be detected. Two inches in January might remedy all this, and send us a heavy vintage.

The July and August rains appear to have been favorable to the "take" of rooted vines; but the young vines are checked in the growth by the excessive heat and dry weather.

Under the circumstances, there is little to be done in the vineyard during January, excepting finishing up odd jobs and watching the fruit ripen. Should we be visited by heavy rains it will be advisable to run the scarifier over the ground; but otherwise the loose soil had better be left alone.

## HOUSEHOLD HINTS.

**STEWED PRUNES.**—Few people know how to cook and use plums and prunes. The first thing is to wash and thoroughly cleanse the fruit; then soak them in enough water to cover them, half an inch deep, for twelve hours, or an hour or two longer. Next stew them slowly in the water in which they were soaked, adding no sugar, but a few cloves may be put in if liked, or a little crushed ginger in a bag made of mosquito net. Sugar may be added after cooking if desired. Stewed prunes regularly used will prevent all necessity for aperient medicines, and will prevent constipation and aid digestion.

**STEWED APRICOTS.**—The following are the recipes for which Mrs. R. J. Jefferey received two prizes at a recent competition at Mildura:—1. Take half a pound of dried apricots, put in a dish, and pour sufficient boiling water over to well cover them. Cover dish, and let them stand half an hour, drain, make a syrup of 1 pint water and 6ozs. white sugar, boil syrup three minutes, add fruit, and simmer gently five minutes. 2. Soak half a pound of dried apricots in cold water twelve hours, drain, make a syrup of 1 pint water and 6ozs. white sugar, boil syrup five minutes, add fruit, and simmer two minutes.

**CRYSTALLIZED OR GLACE FRUIT.**—The principle is to extract the water from the fruit and replace it with sugar syrup, which hardens and preserves the fruit in its natural shape. The fruit should all be of one size, and of a uniform degree of ripeness. Peaches, pears, and similar fruits are pared and cut in halves; plums, cherries, &c., are pitted. After being properly prepared, the fruit is put in a basket, or a bucket with perforated bottom, and immersed in boiling water to dilute and extract the moisture. This is the most important part of the process, and requires great skill. If the fruit is left in too long it is over-cooked, and becomes soft; if not long enough the moisture is not sufficiently extracted, and this prevents perfect absorption of the sugar. After the fruit cools, it may again be assorted as to softness. The syrup is made of white sugar and water. The softer the fruit, the heavier the syrup required. The fruit is placed in earthen pans, covered with syrup, and left about a week, when the first signs of fermentation are visible. This is the critical stage, and the fruit and syrup must be heated to boiling point, which kills and stops the ferment. This will have to be repeated about once a week for six weeks. Then the fruit is removed from the syrup, washed in clean water, and either crystallized or glacéd as required. For glacéd fruit, it is dipped in thick syrup and hardened quickly in the open air for glacing; or left to be hardened slowly if to be crystallized. The fruit is now ready for packing.

## HOUSEHOLD PARLIAMENTS.

The progressive people of Millicent, in conjunction with some members of the Branch of the Agricultural Bureau, have established an organisation which, for want of a better name, they call "Millicent Grange." But they have no need to adopt the warlike tactics which were forced upon the farmers of America by the grasping railway companies and the greedy middlemen; and the name "granger" is not nearly so appropriate and euphonious as "Household Parliament," which truly indicates the aims and aspirations of the peaceful people of the farming fraternity of South Australia. The objects sought by the Millicent "Grange" can with great profit and advantage be adopted all over the colony, and Branches of the Agricultural Bureau could easily act as the organising agencies. Those objects, shortly, are to make homes more and more comfortable and attractive—and there is a very wide scope in those two words. By bringing together, at frequent intervals, the members of the families in the district they learn to like and to trust and respect each other, to work together in promoting the progress of the district in particular and of the colony generally. They exchange experiences, and teach each other how best to utilise the natural and cultivated products of the field, farm, and garden; how to prevent waste, and to utilise articles and substances which otherwise would be neglected; and they learn how to make the home so comfortable and attractive that the young people are not so severely tempted to seek more pleasant surroundings in the city or in distant climes. At the Millicent meeting, held on December 4, a lot of practical advice was sought and given, including recipes for cookery, summer drinks, bee management, treatment of milk, butter, fruit preserving and uses after preserving, and a host of kindred subjects.

Our Branches should consider whether it is possible to arrange for, at least, quarterly meetings of the members, with their wives, elder sons and daughters, and as many neighbors and friends as can be induced to attend. At such meetings an immense lot of good could be done upon the lines above indicated.

## THE DAIRY.

### CHEDDAR CHEESE-MAKING AND DANISH BUTTER-MAKING.

BY JOHN DAVIDSON, LYNDOKH, SOUTH AUSTRALIA (LATE OF GORE  
AND EDENDALE DAIRY FACTORIES, NEW ZEALAND).

#### Introduction.

We often hear reference made to the "art and mystery" of cheese-making by those engaged in the business. In my opinion it is high time the mystery, if any, was revealed for the benefit of the dairy folk of the colony, which is well adapted for dairying. The capability of making good butter is an art of no less importance, though not so intricate, as that of cheese-making. In these, as in every other art, there are some things we cannot hope to learn from books or pamphlets; and he who expects to find here instruction that will take the place of experience will be disappointed.

I have endeavored to state briefly, but with clearness, the reason of rules as well as the rules themselves. The whole process of cheese and butter making will be found to consist of a series of acts, many of them simple and of seemingly small importance; but experience has proved that the importance of these acts is not to be estimated by the ordinary intelligence, but that those things which to the mere onlooker seem without reason and superfluous are really such as cannot be omitted without endangering the result.

With some degree of diffidence I have endeavored to present in an intelligent form the Canadian method of Cheddar cheese-making and the system of Danish butter-making, as studied by myself while under the Canadian and Danish instructors of New Zealand, and which is now taught and practised in that colony by the various experts.

As the result of the experience of a single individual would hardly be satisfactory, I have freely made use of whatever light was to be gained from current sources, and especially acknowledge valuable thoughts and help from Instructors S. M. Robbins and J. B. McEwan, of the New Zealand Dairy Service, and Professor L. B. Arnold, of U.S.A., whose opinions are entitled to special respect. But for him many valuable facts now carefully garnered in the storehouse of dairy information would still be hidden away among the mysteries of unexplored truth.

#### Milk.

As milk is the material from which cheese and butter are made it is entitled to first consideration. It is unnecessary to waste words in describing the appearance of milk. It is, however, well for those who treat milk to be conversant with its component parts. There are many things about cows' milk and its production with which we are all in some respects familiar which yet the most careful students have not yet been able to explain or understand. I shall attempt nothing more than to point such facts as have a practical bearing, leaving a more full statement to some other hands or some future occasion.

Milk consists of fat stuffs, albumen, milk sugar, air constituents, aromatic parts, ashes, water, and caseine. Normal cow's milk consists of about 87 per cent. of water, while about four-fifths of the flesh-forming material is caseine and one-fifth albumen. The butter fats in milk vary from 2 per cent. to 5 per cent., according to the breed of cows and local conditions. The main component parts are caseine and albumen; the first being coagulable with rennet, the latter is not. The albumen, however, coagulates when heat is applied if the milk or whey holding it is acid. The relative proportions of caseine and

albumen vary greatly with the food and health of the cow. Caseine, as found in the animal kingdom, is chiefly dissolved in milk, and is the curd or coagulable part of milk from which cheese is made. Again, albumen is a thick, viscous substance which forms a constituent part of both animal fluids and solids, and which exists nearly pure in the white of an egg. As caseine and albumen are the elements in milk of prime importance to the cheesemaker, so what is designated as butter fats are the main elements with which the butter-maker is concerned. The fats in milk are in a solid state, and are the only solid matter usually found in milk; they exist in the form of very minute globular atoms, which are suspended in the liquid mass, and ordinarily appear round or egg-shaped in form, but in size they are very unequal, varying from  $\frac{1}{1000}$  down to  $\frac{1}{10000}$  of an inch in diameter. Upon the treatment of these minute bodies depends the dairyman's success in butter-making, and it is therefore important that he should be as familiar with them as possible. A clear knowledge of a few leading facts in regard to them will be found efficient in leading to desired results.

The fatty matter which enters into the composition of butter globules consists of four varieties. The hardest of them is stearine, which, when separated, is a hard and white fat; the second in consistency is palmitine, which resembles palm oil—most of the coloring matter in butter is connected with this fat; the third is called oleine, from its thin, oily consistency; the fourth consists of essential oils of the food of the cow, and which probably are as numerous as the varieties of food she consumes. These constitute the fats from which butter is made. They are all derived from the food which the cow consumes; but how much of them is derived directly from the food and how much is elaborated in the body of the animal out of the elements of food is not well established. Their characteristics change with the condition and quality of food, and with the constitutional peculiarities of cows. The fats from the different cows living on the same food are often quite unlike, and in the same cow they change their color and their density with the variations in the food as to age, succulence, &c. There is about  $4\frac{1}{2}$  per cent. of sugar in ordinary milk, and this is the most weighty element in the dry solids. Milk sugar is like ordinary white sugar, but is more easily dissolved in water, and is remarkable for its very low sweetening power and for its instability. It is obtained by evaporating pure whey until a mass like syrup remains, which crystallises into lumps. It is more susceptible to change than any other element in milk; by absorbing oxygen it is with great rapidity converted into lactic acid, and is thus the cause of the sourness of milk. The rapid changes in milk and its unstable character are due to the ease with which this sugar ferments, and which is greatly influenced by the atmosphere. In Switzerland milk sugar is largely separated from whey for commercial purposes, but in our colonies the whey is used as food for pigs.

Thus far we have only spoken of milk in its normal and healthy condition; but as cheese and butter makers are frequently called upon to deal with it in a faulty state, something should be said of it when out of condition and the causes which are known to produce troublesome effects.

**Beastings.**—The first of these is milk from the newly-calved cow—called colostrum. This is milk with the glandular cells of the animal floating in its substance, which may always be seen when the milk has been saved too soon after calving. There exists a difference of opinion among dairymen as to the length of time a cow requires to have calved before her milk is fit for human consumption. I prefer not to take it until after the ninth milking; then only the majority of cow's milk is fit for use, or for manufacturing into butter and cheese. Some cows' milk may be in a fit condition after the fifth milking, while others may require the full time mentioned.

*Souring and other Changes in Milk.*—Milk is constantly undergoing changes from the time it is formed in the lacteal glands until it is manufactured or consumed. When milk first comes into contact with the air a number of agencies at once act upon it, inducing the changes which afterwards occur. Milk does not perish from anything in the nature of its own elements, but is destroyed by influences foreign to its composition. If milk is drawn from the udder without being exposed to the air and sealed up tight it neither sours nor taints, provided it is healthy and sound when it is drawn. Dairy men should always bear in mind that it is what the air contains, and not the air itself, that injures or destroys milk. Milk absorbs from the air the germs of any vile bacteria and the spores of fungi, which grow and multiply, and fill it with their presence and produce the souring. Cold checks their growth, but never kills them. They are not injured at all by freezing, nor by wetting and drying—nothing but heat kills them. One of these spores adhering to the sides of a milk vessel, or in a crevice, may be dried in the most thorough manner possible, and lie there for a week, a month, or even a year, without injuring in the least. The moment it is moistened with warm milk it swells up and springs into active growth, and in a short time its increase may be counted by millions. There is an unknown quantity of good milk injured, soured, and spoiled by allowing some of these sour germs to remain in the cans used in carrying milk to the factories. These germs grow most efficiently at blood heat, and nothing short of a boiling heat is sure to kill them. The influence of the air upon the milk is not confined to the absorption of the spores which produce acidity; spores of every other kind are taken in as well. Nor does the absorptive power of milk end with absorbing living germs; it takes in odors as freely. Every odor as well as the seeds of every ferment that blows over its surface or comes into contact with milk is grasped at once, and its grasp is never slackened. The *London Milk Journal* cites instances where milk that had stood a short time in the presence of persons sick with typhoid fever, or been handled by parties before fully recovered from smallpox, spread these diseases as effectually as if the persons themselves had been present. A maker of first-class butter objects to cooling warm milk in the room where his cream is kept because the odor escaping from the new milk is taken in by the cream, and thus injures the butter. This may seem like descending to little things, but such little things determine whether the products of the dairy are to be sold at cost or below, or as a high-priced luxury. These are some of the changes which are ever progressing under the eye of the dairyman, and he who can most successfully direct and control them is the one who reaps the best reward.

*Spontaneous Coagulation.*—It has happened every now and then in cheese factory practice that milk has been found to coagulate without the presence of rennet or any sensible acidity. Several instances have been given at the New Zealand State Dairy School, and a case came under my observation at the Gore Dairy Factory, New Zealand, where a vat of perfectly sweet milk, having been warmed to the required temperature, coagulated spontaneously. A change in the proportion of the elements is always discoverable in such milk. This is usually brought about by a feverish condition of some of the animals from which the milk is drawn, produced, doubtless, by bad water, or the unwise use of a dog. We know that the milk from a cow that has been excited and worried into a fevered state has less butter fat than it otherwise would have, and besides its keeping qualities are ruined.

*The Odor of New Milk.*—Nearly every one accustomed to handle milk must be more or less familiar with its odor, especially when first drawn from the cow. It has a "cowsy smell," or odor, peculiar to it at that time, but which soon passes away when the milk is thinly spread and exposed to the atmo-

sphere. When milk freshly drawn is confined in covered cans this odor will be found to be a disturbing element; indeed, the longer it is so confined the more putrid and offensive it becomes. The influence of animal odor on butter is as deleterious as upon cheese. If the odor of new milk is carried into the cream the butter made from it has a modified flavor in consequence. Butter made from milk which has been contaminated by evil smells, or by a feverish condition of the cows, or from carrying it closely covered, takes on an unnatural, strong, and unpleasant taste and a greasy appearance.

*With regard to Cheese.*—Before entering upon the process of cheese-making, it will be well to refer to a few of the natural agencies used in the manufacture of cheese; these are—heat, rennet, salt, and the atmosphere, which, working together in harmony, produce the various changes which milk must necessarily undergo in being converted into cheese.

*Heat.*—Of these the first to be considered is heat. Cheese-making is a digestive process, and corresponds to the operation which takes place in the stomach of a young animal. Heat must be applied to the milk at the outset to ripen and hasten the acidity before the rennet is mixed, and then later on to raise the temperature, cook, and expel the whey, and in fact throughout the whole process of curing a required heat must be maintained. In the natural digestion heat is really the first agent employed, the normal condition being 98°. But for one element in milk—namely, albumen—it could be coagulated cold, but a slight heat and a little acidity is necessary to simultaneous coagulation of caseine and albumen. The degrees of heat vary at the different stages, which will be explained when I arrive at that branch of the subject.

*Rennet.*—Perhaps the most important agent is rennet; it is certainly the most powerful. Rennet is a natural secretion from the walls of the stomachs of calves or other animals, otherwise known as gastric juice. For many reasons the rennet obtained from calves is universally in use. To obtain the best rennets such calves should be selected as have subsisted on milk at least three days; five, however, would be better. It is a good practice to feed a liberal allowance of milk twelve or fifteen hours before killing. As the inside coating of the stomach contains the concentrated strength of the rennet it is desirable to preserve it as much as possible. To this end, the sack, when taken from the calf, should be handled with great care. It should be emptied and turned inside out, and any further cleaning can be done by wiping with a moist cloth; never use water in cleaning, as some of the gastric juice will be lost. Now salt lightly, and dry in the most convenient way. It may be stretched on a crotched limb, or it may be cut open and laid on a dry board, which will aid drying and absorbing its moisture. This mode of preserving is much better than salting in pickle or filling with salt.

In factory practice only the concentrated extract of rennet is used, which is prepared in large quantities at laboratories for the purpose, and supplied principally in gallon bottles. Hansen's rennet extract is the most reliable, and is most favored by cheesemakers in New Zealand and the Australian colonies. Considering rennet as the agent of the natural digestive process, it will be proper in this connection to consider the office which rennet performs in that operation. Coagulation takes place in the caseine of milk when brought into contact with rennet and some other acids, and a corresponding change in the albumen under the influence of heat. The particles of caseine which float in the water of milk are brought together and made to adhere; whereupon, under the influence of heat, these particles contract, and the water or whey which lies between them is expelled. In the stomach of an animal no more nor no less digestive fluid is used than necessary; so the cheesemaker following the example should distribute his rennet as evenly as possible, seeing that every particle of caseine has its share. Nature employs with unmistakable



certainly the quantity of rennet necessary to coagulate a given quantity of milk; man can acquire this knowledge by experience, but he must resort to a test. For this purpose take a tea cup full of milk, introduce a given quantity of rennet, say a drachm, and note the time employed in coagulation. This will give the necessary factors with which to compute a result. Thus, if one drachm of rennet is found sufficient to coagulate a cup of milk in a given time, then a greater amount of rennet will coagulate a proportionally greater amount of milk in a proportionately quicker time. If a maker has on hand rennet with the strength of which he is familiar, he may readily compare with it a fresh supply by a comparison effected by the use of two tea cups, in one of which he coagulates with the old and the other with the new. If the old is found to perform its work in twenty seconds and the new in thirty, then it follows that a third more of the new is required. This is very important to know, as the strength of rennets often vary much, and the addition of too strong or too weak rennet would engender faulty results. It is of first importance that only good sound rennet is used, as it enters into the structure and texture of the cheese, never losing its strength, and therefore the necessity for using a perfect article becomes apparent. It follows that a really good cheese can never be made from impure and faulty rennet. Rennet is an extremely powerful agent. If one figures it out it will be seen that 40zs. of rennet to 1,000lbs. of milk is one part of rennet to 4,000 parts of milk; yet it is capable of coagulating it in about fifteen minutes, other conditions being right. The strength of rennet should always be spoken of in terms of time and temperature, and not in quantity. For instance, if we want to make a fast-curing cheese we should say use enough rennet to coagulate in fifteen to twenty minutes at 86° Fah., and if we want to make a slow-curing cheese we should say enough to coagulate in thirty to forty minutes at 86° Fah.

*Salt.*—In cheese-making salt acts as a seasoner and preserver, and should be used understandingly, as the work it does is more important than it may at first thought appear. Rennet no sooner unites and gives solidity to the curd than it turns about and begins a work of disintegration and decomposition—a work which would speedily result in total destruction of that substance were it not for the presence of the salt. It acts as a check upon the rennet and upon the acid, and should be so used as to establish a healthful balance between the decomposing and preserving agencies. There is a great deal of impure salt in the market, so there is reason to be careful in selecting a good brand. Do not endanger the quality of butter or cheese by using impure salt. If, when the weather is damp, salt will attract moisture enough from the air to appear wet it is unfit for putting in butter or cheese. Pure salt remains dry in wet weather. It is the impurities in salt (notably the chloride of calcium) which attracts moisture; hence salt which will vary with every change in the hygrometric condition of the air should be rejected by dairymen as impure and unfit for use.

*The Effect of the Atmosphere.*—More particularly in cheese-making does the air come in for attention. Ripening or souring is the action of germs deposited in the milk from the air, which eventually produces acidity. If the night has been cold and the atmosphere in the morning still remains at a low temperature the maker will find that nothing in the way of ripening has been accomplished. If, on the other hand, the weather has been warm this process may have proceeded to a considerable extent. In the latter case he may commence his labors at once, while in the former something must be done to bring about this change. A ridiculous practice with some makers is resorting to a bucketful of sour whey to arouse dilatory nature. The better practice is to raise the temperature of the milk to a degree in which the germs naturally begin to work. In very cold weather, when the milk will arrive in a sweet condition and be slow to ripen, I would recommend using a pure culture starter, which, in cold times,

can be kept ready. A pure starter is made from new milk kept from the previous day and allowed to sour slightly, but not coagulate. The lactic fermentation thus developed contains millions of the desired kind of bacteria in it, and these, when they are put in the milk in the vat, increase very rapidly and hasten ripening. Pure air, when brought into contact with curd, expels, to a great extent if not entirely, objectionable taints and gases; so that careful stirring and a thorough exposure to the purifying influence of the air will do much towards a restoration. In curing cheese everything depends upon the condition of the atmosphere. Below a given point the process is arrested altogether; above that point it proceeds too rapidly, inducing a separation of the elements, while dampness induces mould and other evils. A uniformly warm and dry atmosphere is essential to the proper curing of cheese. The temperature of the curing-room for full milk cheese should be 65° to 70° Fah.; for part skim or skim, 70° to 75° Fah.

### **The Canadian Method—Cheddar Cheese Making.**

Cheese-making commences with the milk, a perfect article of which in such quantities as are accumulated at factories is rarely seen. It seems to be the misfortune of those engaged in the manufacture of cheese to commence their efforts under conditions which make perfection impossible. If a perfect article of this substance is ever to be produced the process must begin at a point remote from the cheese factory, viz, *with the milk producers at the farm.*

Cheese-making consists in applying certain laws by which nature governs the process, which, if strictly observed, will lead to the desired end, and any departure will end in defeat. In South Australia a factory fully equipped and wholly designed for the manufacture of cheese would not be a wise possession because the climatic conditions in summer necessitate factories resorting to butter-making. But when a factory is proposed to be erected, whether for butter or for cheese, let the location be selected upon high and dry ground, so that all refuse matter may be conducted speedily away to a safe distance. In commencing a factory many difficulties are to be encountered. New Zealand teems with instances of first experiences, mistakes, and mismanagement of companies, and from these initial difficulties there has evolved a factory system second to none in the Southern Hemisphere. There are many different minds, and many different methods of running a dairy. Troubles and disputes most frequently arise between the factory and milk suppliers, and invariably it is traceable to the bad condition of milk supplied. If each individual patron perfectly understood the natural laws which govern the production of milk, and obeyed them, the cheese and butter maker would be relieved from many sore vexations; but the fact is a large number of them cannot be made to understand, so the vats are filled with the unhappy fruit of ignorance. There are others who cannot be induced to provide their cows with sweet, wholesome food with which to bridge over the dry portions of the season. Dishonest men are not all dead yet, and even among those who object to be placed in this list there are some who do not hesitate to abstract some of the cream, or even to add water to the milk forwarded to the factory. These are some of the characters the wary cheesemaker must carefully watch for. But then there is another class of whom I must say a word, namely: the clear-headed, painstaking, industrious, and honest farmers who always bring large yields of pure wholesome milk, the result of whose labor and foresight is too often neutralised in the vat by the product of vice, shiftlessness, and ignorance with which it is mingled. The experienced cheesemaker will satisfy himself by his nose and otherwise that the milk is free from taint on its arrival, and reject whatever may possess a sour or tainty smell.

The milk is now in the vat, and the maker should know how far it is on

the road to maturity, and will regulate the treatment accordingly. If the milk be far advanced he will not heat to more than  $82^{\circ}$ ; if otherwise it may be warmed to  $90^{\circ}$  and allowed to cool down, during which time it will have considerably matured. The proper temperature for setting is  $86^{\circ}$ ; always let this be the setting point, unless either of the extremes mentioned exists. Let me here say that there is no absolute rule throughout the whole process—each day the operator must vary his treatment according to his material if a uniform article is desired. It is possible to require variations in the temperature, the time, the amount of rennet, acidity, and salt from day to day; there is no rule-of-thumb system in cheese-making.

*Adding the Color.*—When the temperature of the milk has been raised to the right point by means of steam, hot water, or otherwise, the color can be added and well stirred in. The amount of color necessary depends upon requirements and taste of the market for which the cheese is being made. The South Australian fancy demands a different class of cheese from that required in the London market. The New Zealand local market desires a straw-colored cheese, while in this colony a high carrot color is sought after, presumably because the impression was that the higher the color the richer the cheese. This is a mistake, because the quality of the cheese suffers by the addition of annatto coloring, as it contains potash and alkaline matter. There is a large demand for "white" cheese in the Home market, and consequently New Zealand supplies quantities of this, made without any coloring being added, while the colored cheese for the same market must be of a straw tint, which is obtained by infusing 1oz. to  $1\frac{1}{2}$ oz. of Hansen's color to every 1,000lbs. of milk. For the Adelaide market something like 2ozs. to  $2\frac{1}{2}$ ozs. would suit the eye of the buyer.

*Adding the Rennet.*—In order to ascertain if the milk is fully matured for setting we take a tea cup, holding a gill, and into this, full of milk, we introduce a teaspoonful or a drachm of rennet of known strength, and note the seconds employed in coagulation. If it begins to thicken in twenty seconds, add your rennet immediately; if in forty seconds, then it is evident the process of maturing ought to be carried forward yet for some time. Sudden coagulation indicates the presence of the desired maturity; if slow, subsequent application of the test. Many cheesemakers do not appreciate the fact that it is highly advantageous that the milk should be ripe before adding the rennet. It helps the action of the rennet, and balances the process which enters into the composition of cheese itself. The above test is a simple and correct one, but the maker must use his own judgment. The quantity of rennet used is regulated, usually by the season and the quality of milk. Rennet should be added at the rate of 3ozs. to 4ozs. to every 1,000lbs. of milk. These things must be considered:—Strength of rennet, season, maturity of milk, and whether a fast or a slow curing cheese is desired. If fast curing, add more rennet and less salt; if slow, use less rennet and more salt. We usually reckon the quantity of rennet by fractions in order to be exact, as a few drops more or less may materially alter the result. Remember we must always have good rennet to make good cheese. Milk in a forward state of maturity will coagulate with less rennet than when sweet and new, but this should make no difference with the quantity used, as the curing of the cheese is what we must consider. Always time the process of setting from the time the rennet is put in, and stir from three to five minutes, so as to thoroughly incorporate the rennet with the milk. A suitable curd rake, with teeth  $2\frac{1}{2}$ in. wide, and of convenient length to reach the depth of the milk vat, should be used. Thorough stirring is recommended, so that the color and rennet may mingle with the milk. The vat should be covered after setting in order to prevent the cold air affecting the surface. Calico fixed on light battens will make a suitable cover. When

coagulation is perfect, which may be known by inserting a finger into the curd—and if it splits clean before the finger it is ready—the work of cutting may begin.

*Cutting the Curd.*—Let the cutting be done as carefully as possible: first with the perpendicular knife lengthwise, then across with the same knife, and finally horizontally, not waiting, as many do, for the curd to settle in the whey and become matted. Extreme care must be exercised in order not to produce white whey, which is caused by jamming and bruising the curd, and so breaking off small particles that pass away in the whey and are lost. The curd now, if carefully cut, is in small cubes resembling dice. Unlike some cheesemakers, I am in no haste to apply the heat, knowing that the chemical process is still going on, and so for fifteen minutes address myself to the work of careful hand stirring. By observing this one advantage is gained—the separation of the whey from curd being more thoroughly effected than by the application of heat immediately after cutting, as heat has a tendency to harden the exterior of the cubes before the whey has all escaped. It is usual to extend the heating over thirty minutes; in slow curds up to forty minutes. This operation is commonly called “cooking” the curd. Experience has shown that a maximum of from 96° to 98° must be attained, even if the milk be set at 82°; 96°, however, is the ordinary cooking point. In cases of fast working sour milk we run it up to 99° and 100°, in order to keep pace with the acid action. As careful stirring—first with the arms and then with a rake—is necessary all the way through, in order that the white whey be not started, do not heat too fast, as rapid heating requires rapid agitation. After the steam is turned off stir for five or ten minutes to secure a uniform heat in the whole mass. A good thing by which to discover when the curd is cooked is to compress a quantity in the hand. If sufficiently cooked it will be found to have attained a certain degree of elasticity, and whenever the pressure is removed the particles will resume their former shape and size. When this condition is reached it will be time to draw the whey, but not before the maker has applied a portion of curd to a hot iron to ascertain if any visible acidity has developed. If on application to the hot iron the silken threads draw out  $\frac{1}{2}$  in. before breaking, the whey must be got rid of as speedily as possible.

*Draining Off the Whey.*—It is an important point not to allow the whey to remain on too long with the curd, as too much acid will be developed, and a dry, mealy cheese is the result. When the whey has been drained off it should be removed to a curd sink; but in the absence of a sink it can be packed on a wooden grating in the vat, and there further drain and mature. The grating used is made of small slats of wood, generally divided in two sections made to fit and cover three-parts of the vat. Over it a strainer cloth is thrown, and the curd transferred to it. In a short time it will closely mat together, when it should be cut into pieces 4 in. in width with a dull-edged knife. It is necessary to turn these every few minutes for a time to allow the remaining whey to pass away. Some cheesemakers contend that matting the curd is of no importance in the process, but experience has shown that such ideas are erroneous. We know of no way whereby that firmness of texture and at the same time soft flexibility can be obtained but by matting. Now the curd is gradually becoming softer, and a velvety feeling is being developed; its coarse, harsh texture is giving place to one of a more cheesy character. The curd must still be kept warm; the calico or canvas cover previously mentioned should be drawn over the vat between the different operations. It is highly important to keep the curd warm while maturing; many cheeses have been spoiled with cold draughts from doors and windows.

*Millling.*—It is desirable that the curd be cut into small pieces of equal size without bruising and without starting the butter fat, and to effect this the best

machine to use is the Macpherson curd mill, which is so generally used in New Zealand and Victoria. Curd cut with this mill does not patch together, as is the case with the peg mill, and perfect uniformity in the size of the pieces, the permeation of the salt cannot be otherwise than uniform.

*The Required Acidity.*—During the “cheddaring,” or souring process, which the curd is undergoing in the vat it is well now and again to ascertain what progress the acidity is making. To this end take a small plug of curd and apply it to a hot iron warm enough to make water simmer; then draw away slowly and note the length at which the silk-like threads break. If they extend to an inch it is time to apply the salt. In Cheddar cheese-making it is the practice to allow these threads to be 1 in. to 1½ in. in length before applying the salt, but this cannot be laid down as a rule. In New Zealand when the spring milk is thin and washy our practice was to cheddar lightly, only putting in ½ in. of acid, but as the season advanced gradually increased, and in autumn up to 1½ in. on account of the milk being stronger and containing more caseine.

*Salting.*—Salt is an important factor in cheese-making. It checks the progress of the acid and aids in expelling remaining moisture, besides seasoning and preserving to some extent the perishable parts. Salt retards the curing process. If we wish to have a quick-maturing cheese salt lightly, 2½ lbs. to 1,000 lbs. milk; for ordinary curing, 3 lbs. to 1,000 lbs. of milk is the quantity necessary. We should consider the condition of the curd when it is applied, making allowance for the amount of moisture still remaining, in which some portion of the salt will be carried off in draining and pressing. In the cheese salt performs a hardly less important function than rennet. After the application of salt thorough and continued stirring is necessary to secure a perfect and equal distribution. Then allow it to stand for ten minutes to give it time to dissolve and permeate the curd, which can then be put to the press. The best temperature for going to press is 80° to 85°. Cold curd will not press closely.

*Pressing.*—To make the cheese of uniform size and weight the curd should be weighed or measured into the hoops. Press gradually until the whey is expelled, and then put on the full pressure. To avoid cracks press a cap on each end. The idea to make a cheese dry by pressing it is an erroneous one. The whey must be got out while in the vat, for no amount of pressing in the press will expel it all.

*Curing.*—When the cheeses are removed to the curing room, their ends should be rubbed with hot fat of some kind to smooth down the ends of the bandages, prevent cracking, and render them impervious to the jumpers. During the first month they should be turned every day. Keep the temperature of the curing-room at 65° and never above 70° if possible. In extremely hot weather, to prevent excessive drying, I would recommend sprinkling the floor.

Many cheesemakers seem to suppose that as soon as the cheeses are upon the shelves they are out of harm's way, and need no further care and attention from them, and the business of rubbing and turning is given over to the boys.

### Notes and Comments.

I append a few notes of lectures and explanatory remarks concerning cheese-making and other data:—

*Color.*—When the curd shows color early it is a sign that the acidity is coming on. The acid in a soft curd, when it commences to develop, comes on fast, while a hard-cooked curd progresses slowly. By cooking hard we lose quantity and quality, and a hard curd requires more acid than a soft one. If the curd is soft press gently at first, as by hard pressing the fat is forced out and so lessens the quality of the cheese.

*Too Much Acid.*—Not only does too much acid make a soft mushy curd, but there is also a great loss of fat. It aids the rennet in coagulating the milk, but counteracts its action in converting curd into cheese, and hence retards the curing process. Lactic acid has little influence upon the solid fats, and readily dries up the essential oils. The more acid developed the less will be the fine aromatic, nutty, flavor in cheese, and can be all wiped out at an advanced stage of acid. The ability of lactic acid to absorb volatile oils is of great service in neutralising excessive animal odors and taints in milk. In extreme cases of taint and gas as much as 2in. of acid may be allowed to develop.

*Gaseous or Pinholey Curd.*—Nearly every maker knows something about gassy curd. It is often the product of bad smells contracted by the milk, and also of various weeds eaten by the cows. It is an important point to know how to control such fermentation. The ordinary souring of milk is not the only fermentation which arises from germs or bacteria. Through the action of lactic ferment the milk sugar is decomposed, but in the other fermentations the caseine is attacked, and gas formed, which collects in little holes about the size of the head of a pin. Bacteriologists have separated quite a number of peculiar ferments that are produced by distinct species of bacteria. For instance, there is the butyric fermentation, in which butyric acid is the decomposition product formed, and the alcoholic fermentation, in which alcohol and carbonic acid gas are formed. If a curd is found affected with gas it should be stirred thoroughly after milling, and exposed to all the air possible. Exposure to the air by patient stirring will accomplish wonders in removing the gases and other odors which have been implanted in the milk.

*Cooking with Water.*—In an emergency, when we have to deal with extremely sour milk, we have cooked with water. Get rid of the whey at once, and heat a quantity of water up to 100° or 105°, according to the amount of acid. Put on the water, having all hands keeping the curd apart. When one water is not sufficient, run off and put on fresh until the acid is washed away and under control. The water draws the acid out of the curd in the form of whey. Particular care must be taken to keep the curd well apart. See that the water does not cook too hard. Pack and cheddar in the usual way.

*Working Sour Milk.*—Milk often responds to an acid test before the presence of acidity can be recognised by tasting. The course to be pursued is the reverse of tainted milk. In the latter we have too much rennet action, in sour milk too much acid action. We use less rennet in the tainted milk therefore, and more in the sour milk, in order that the rennet action may keep pace with the acid. Set at a low temperature, about 80°. Add extra salt, and cook higher. Break up fine and mill early.

### Butter-Making.

Butter is a prolific source of wealth to all the countries where it is manufactured, and will continue to be so long as there exists a civilisation to demand its manufacture. Butter-making, however, is only profitable to those who produce a good article. The modern means of separating the cream globules from the milk is by the separator, and there is no necessity to refer to the systems of deep and shallow setting. Presuming that the cream has been cooled on leaving the separator, in order to prevent too rapid fermentation, it should be mixed with that of the previous day, to ensure a uniform ripeness for churning. Ripeness is the term used to indicate the degree of acid ferment. The principal circumstance which affects the ripening of cream is temperature. The cooler it is the slower it ripens. To produce the best results for general use, and the largest yield, the cream to be operated on should have a moderate

sourness, and it should all be equally advanced. If some of it is sweet and some of it sour the unlike parts will not churn in the same time, and a part of the butter will be left in the butter-milk. The separating of the cream is an important point, and the control of the temperature afterwards another. Before pasteurising was introduced the Danish practice was to take the cream from the separator and put it into a cream vat underneath which steam and cold water could be introduced when required, so that the temperature of the cream was under the butter-maker's control. In this way the ripening process could be regulated to the right degree.

Pasteurising cannot be carried out everywhere conveniently, but it is highly advantageous and produces finely-flavored butter. To ensure successful pasteurising the cream must be raised to a temperature of  $168^{\circ}$  for about ten minutes, and then cooled to  $60^{\circ}$ . At this point a pure culture starter is put, which generates a lactic ferment, which imparts the desired aroma and flavor to the butter.

*Starters.*—In the ordinary ripening process in cold weather a starter is often resorted to. It consists generally in a portion of the butter-milk from the previous day, if it is sound, or a starter manufactured from new milk.

*Temperature for Churning.*—The fundamental principles for making butter are similar throughout the colonies, and experiments have proved that the best temperature to churn at is  $58^{\circ}$  to  $60^{\circ}$  in summer and  $62^{\circ}$  to  $64^{\circ}$  in winter; this is for ripened cream, but for sweet cream it is necessary to churn at a lower temperature, say,  $50^{\circ}$  if possible, otherwise particles of cream would be left in the butter milk.

*Churning.*—There is a diversity of opinion as to the merits of the different methods of churning. The most favored and expeditious method is concussion by means of the box churn. The churn should be scalded with water at about  $180^{\circ}$  and then cooled with cold water. Strain the cream into the churn to break lumps. White specks in butter come from different causes. There are at least two causes which produce this result; one is dried cream, but it is very seldom that dried cream produces the specks, for if cream is dry when churned, unless the butter comes very quickly, churning long enough to bring the butter will dash the dry lumps to pieces, but sometimes that may not occur. The usual cause of flecks in butter is the coagulation of drops of milk which had been left in the cream. In churning care should be taken not to drive the churn too fast at start until all the gas has escaped. The process of churning divests the fat globules of their membranous envelopes, which then adhere to each other, and increase in size with the progress of the churn. When they have reached the size of wheat grains it is time to cease churning. This granular and unbroken condition of the fats is what constitutes the grain of butter. In this state butter has its best flavor and best keeping quality, and is now in the proper condition for washing with pure water until it leaves the butter in a clear state. Too much washing, however, will injure the aroma and flavor, but care should be taken not to have any butter-milk remain. Keep butter in the granular state till on the butter-worker and salt on. Thin cream should not be churned at a low temperature, not under  $60^{\circ}$ , while thick cream can be churned at  $50^{\circ}$  to  $55^{\circ}$ . If thin cream were churned at  $50^{\circ}$  there would be a great loss of butter-fat in the butter-milk.

*Salting.*—The amount of salt depends on the taste of the consumer. The average run of salt is 3 to 4 per cent. For the British market  $\frac{3}{4}$  oz. to the pound of butter is the usual quantity. To make butter keep  $2\frac{1}{2}$  per cent. of salt is just as efficacious as 5 per cent. Use only the best salt, and weigh both salt and butter in order to get exact quantities. Butter should be reworked in six to eight hours; if left over night it will be too long exposed to air, resulting in the outside of the butter becoming ill-flavored.

*Working the Butter.*—The object of working butter is to free it from remaining butter-milk and water, to mix salt through it evenly, and make the mass as solid as possible. The less labor with which these ends can be accomplished the better for the butter. If well washed in the churn, little working will free it from the water left in. In all the processes of handling and working butter the preservation of the grain should be kept in view.

*Coloring Butter.*—When butter is very pale its market value is enhanced by coloring. This should always be done in the cream before churning, and it is best done with annattoine or some preparation of annatto. Richardson's and Hansen's are two reliable brands of coloring. No coloring should be added directly to the butter; it would be impossible to incorporate it evenly after churning. Artificial coloring should be sparingly used; the added hue is seldom, if ever, equal to the natural one, and if it is a little too strong it disfigures by giving an unnatural appearance.

*Aeration of Milk.*—The New Zealand Dairy Act provides that all milk intended for a cheese and butter factory must be passed through a cooler and aerator before being delivered. When this is found to be so beneficial in a much cooler climate, how much more necessary is it in Australia, where a semi-tropical climate reigns for six months in the year. The quality of milk would be improved beyond expectation. The main improvement would be found in the higher quality of the cheese and butter made. Milk producers would benefit by the operation because their milk would then be in a fit condition to be received in any weather at the factories. Milk aerated and cooled will keep sweet fully twelve hours longer than if left with animal odors and heat in it. Cooling milk without aerating does not get rid of the "cowy" smell, but it must be exposed to a current of pure air. To do good work aerators must be of plain construction, so as to be easily kept clean. If they are not regularly and properly cleaned they will do more harm than good. A plain concern with a series of perforated tin gutters arranged a little above each other, fixed upon a stand to which attach a small spout to deliver the milk into a can below, would make a serviceable and cheap aerator. A receptacle of some kind placed above the aerator, out of which allow the milk to pass slowly over the perforated tins, and thus it will drip from one gutter to another, exposing every drop to the pure air. The aeration of milk should be done apart from all smells in a pure atmosphere. A slight breeze or draught will greatly improve the purifying process. Milk suppliers should be doubly careful in not allowing objectionable matter to collect in the crevices of milk cans. Skim milk and whey taken home, and allowed to remain in the cans all day, the latter being roughly swilled out in the evening; such an uncleanly practice, of course, has a deleterious effect on next day's milk. All the good work that may be done by cooling and aerating can be undone by putting the new milk into cans not properly cleansed. It is a certainty that airing milk is of more value than cooling it, and experience shows that stirring with a dipper has a preservative effect.

*Preservatives.*—I am utterly opposed to the use of preservatives in milk. They impart an objectionable odor and precipitate the cream in small clots, besides alkalinity is introduced in the milk. Their use should be legislatively prohibited. At the present time the Danish Government is putting a Bill through Parliament absolutely forbidding their use.

*Payment for Milk by Relative Value.*—The system of paying for milk according to its butter fat is becoming general and popular among milk producers and dairymen. At a recent conference of factory managers, at the Edendale Dairy School, N.Z., data were tabled which settled beyond doubt that milk showing 4 per cent. butter fat made superior cheese than did the milk of 3.6 test, besides such cheese had actually brought a higher price than the poorer test milk. In the dairy section of the Chicago World's Fair



accurate data was got on this question. Milk from the various breeds of cows was thoroughly tested for cheese-making purposes, and it was found that cheese from Jersey milk brought a better price than that of any other breed. The number of pounds of cheese from pounds of milk was not so great, but the returns pound for pound were in favor of the Jersey. On the introduction of the Babcock system there usually arises a friction between suppliers and factory owners. To cope with this a greater amount of confidence must be placed in the managers. To gain such confidence managers must become thoroughly posted up in every branch of their business, both practical and theoretical.

The best cow for the dairy is the one that will produce the greatest quantity of butter during the year in comparison with the amount of food consumed.

It has been proved that rich food does not increase the percentage of butter-fats in milk, but it does increase the quantity of milk, which, being equally rich with that produced from poorer food, will naturally result in more butter. Therefore generous feeding results in more butter, though not richer milk.

Pedigreed cows from good dairy breeds, when mated with pure-bred bulls of the same character, are far more likely to produce high-class dairy stock than any cross between a mongrel or common cow and a pure-bred dairy bull. In one case it is blind chance that would give a favorable result, in the other case it is a moral certainty. A half-bred bull should never be used to *improve* a dairy herd.

Large-framed cows require a large quantity of food to maintain their flesh and frames, and above that they need food for the "manufacture" of milk. A good large cow would keep in the dairy yard perhaps seven years, and during all that time her bodily frame must be kept up with food, and finally she is sold to the butcher. Her skin would be worth a little more than that of a smaller cow perhaps, and she might have a little more meat on her—old cow beef! But will her whole carcass repay the extra food consumed during the seven years? The small cow—Jersey, Ayrshire, or grade—will eat much less, give as much butter, her heifer calves (if resulting from a pure dairy-bred bull) will be worth much more than those from the large cow, and can be reared in less space and upon less food. Is it reasonable to ask that a cow shall be worked for seven years in the production of butter, and then be expected to make tender beef?

Lucern for cows should be cut and left in the field for a few hours until wilted. This will prevent any taste or odor being imparted to the milk. Lucern hay should always be made when the plant is budding or just in flower. If left later the plant becomes woody. The hay should only be carted in the early morning or during cloudy but fine weather. Green lucern in alternate layers of a foot thick with cereals—such as barley, wheat, &c.—placed in the silo will make excellent fodder for all kinds of stock.

Dairymen who can find an acre or two of nice deep, rich, sandy alluvium on their farms, should grow parsnips and carrots for their cows. Mangolds, maize, sorghum, and pumpkins will also be found profitable to grow.

One prolific cause of bad odors and offensive flavors in milk, cream, and butter is the presence near or about the milking sheds of strongly-smelling substances. The men who do the milking are not always particular to wash their hands after handling silage or other matters; sometimes the silage in the manger is odorous. Stagnant water is occasionally attractive to cows, and that will affect the milk. Anything whatever that possesses an odor will make the milk smell or taste badly if it is left near it for only a few minutes.

Directly a cow shows signs of being "out of sorts," find out what is the

matter with her. This attention may save great loss to the owner, and possibly may prevent the communication of disease to those who consume the products of the cow. Everyone knows now that many serious diseases of the human family are communicable from cattle to mankind, and therefore there is need for the greatest care in respect to the health of our cows.

Large quantities of condensed milk are still being imported into all of the Australasian colonies, and even Canada and the United States of America make the same complaint. Attempts have been made in New Zealand more than once to establish factories for condensed milk, and a very good article was made; but the cost was too great and the trade too small to make the industry profitable. The Swiss and other factories have the whole world for customers, and with such a market a very small margin of profit on each case will make a big aggregate by the end of a year. It would be a big undertaking to try and drive foreign condensed milk out of the Australasian markets.

The most progressive dairymen of Missouri expect their cows to each yield 25lbs. of milk a day during the first 100 days, 20lbs. during the second 100 days, and 15lbs. during the third, making a total of 6,000lbs. in 300 days, leaving sixty-five days for recuperation. With proper facilities for raising cream this milk, worked into butter, makes 240lbs. A very few dairymen make their cows yield an average of 7,500lbs. of milk a year, from which they make 300lbs. of butter. Much the greater number of cows kept for dairy purposes in the State yield less than 4,000lbs. of milk a year, and from this the butter produced is less than 150lbs.

## SOIL FERTILITY.

Many years ago, at a meeting of farmers held in Adelaide, South Australia, the opinion was expressed that the soil in this colony was fertile to the centre of the earth, and that it was impossible to exhaust it. In confirmation, it was stated by one farmer that he had grown twenty big crops of wheat consecutively on the same land, and that the last was as good as the first. That same land at the present day will not produce even a hay crop, because it has been cropped too often with cereals without any compensation for the plant-food removed. Possibly some of the barley-growers at Hog Bay, Kangaroo Island, could record longer experiences of continuous cropping without manuring, but the time always comes when the land will refuse to yield crops without compensation.

There are certain laws of nature which prevail everywhere without change. In order that a plant may grow and develop its seeds there must be the material ready in the soil for that work. Nature can no more build up a plant or anything else without materials than a mason can build a stone house without stone and mortar. Nature also requires water to carry up the material, and a certain temperature and several other conditions to enable her to do the work properly. The basal laws in agriculture are as follow:—

1. A soil is only fertile when it contains sufficient of all the matters requisite for the support of plant life, and these must exist in an available form.

2. With every crop taken from the soil a portion of those plant-foods is removed. A small proportion of a few of those constituents is restored slowly by atmospheric influences; but most of the mineral matters have been removed permanently, and must be restored by means of chemical or commercial fertilisers.

3. The organic constituents of the soil, capable of fermentation, may be afterwards volatilised by heat, and thus may be lost. This loss can be prevented by cultivation, keeping the surface pulverised and loose so that the

air can enter. The loose dry soil will "fix" the ammonia, and will also abstract considerable nitrogenous matter from the air. If no plant product and no animal or animal product is ever removed from the land its fertility will remain undiminished, and the same will be the case if the full constituents of any crop removed are restored in the form of soluble manures.

4. The manures produced on the farm, although of great value, are not sufficient in themselves to maintain fertility in the soil. The deficient elements are principally phosphates, potash, and some others of minor importance, though necessary.

The farmer must not treat his farm as a mine, but rather as a bank. There are limited deposits in his soil, and these deposits will give him good interest when manipulated properly; but he must maintain, and where possible, add to the principal deposits in his bank, so that his interest may be larger and more certain. No mine can be inexhaustible, because the minerals do not grow, and every ton removed decreases the total bulk. Neither is an account at a bank permanent where drafts are constantly made upon the principal without any deposits being made. So, with the soil, for every pound of phosphoric acid, potash, or other matter removed in a crop of wheat, or herd of live stock or other product, at least an equivalent must be restored in the shape of commercial or chemical fertiliser.

A mischievous and false impression has been entertained by some people that the rain, especially near the coast, restores everything that has been taken out of the soil by crops and flocks and herds. It is true that in some localities where there is a heavy rainfall—say 40 in.—some 9 lbs. or 10 lbs. of nitrogen per acre may be returned annually; but a single wheat crop will remove about 48 lbs. of this material from each acre in addition to the phosphoric acid, potash, lime, and several other ingredients which would not be returned to the soil by rain or atmosphere during hundreds of years.

The quantity of phosphates, nitrates, and potash required by any crop may be comparatively small, and the analysis of a soil may show a relatively large proportion, but it all depends upon the solubility and availableness of those substances as to whether the soil is or is not fertile. Phosphoric acid, for instance, takes up lime in combination, and the greater the proportion of lime the more insoluble or unavailable is the compound. Then moisture plays a most important part. Plant-food can only be carried in solution. If there is not sufficient water in the soil the plant-food cannot be dissolved, nor can it be transferred from the soil to the various parts of the plants; and if the plant-food is insoluble in water it remains in the soil till natural agencies in that soil break up the combinations and render it soluble in water. Whilst this is being brought about the plant is starved.

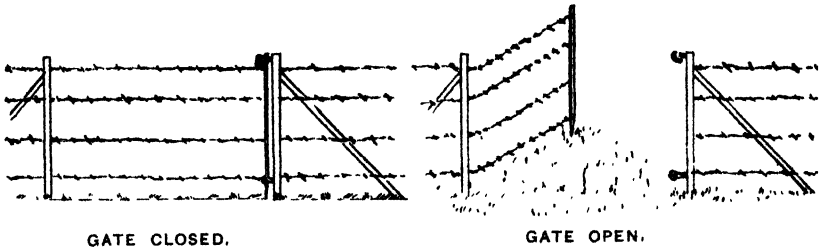
## SUPERIOR VALUE OF LARGE HEAVY SEED.

MESSRS. Gilbert H. Hicks and John C. Dabney, First Assistant and Assistant Botanists, Division of Botany, U.S. Department of Agriculture, have been experimenting with heavy seeds and light seeds of several varieties. The results verify the conclusion arrived at long ago by gardeners and farmers. In every respect the plump, well-developed, matured seeds gave the best results. The plants were more robust, taller, stronger, developed more rapidly, had more and stronger roots, and bore heavier crops of plump good seeds than were obtained from the lighter seeds. The various seeds were sown side by side in pots of soil exactly of equal composition, and treated alike in every respect. Observations were made from day to day, and photographs taken frequently of the competing plants, and the conclusion arrived at was that it

does not pay to sow inferior seed. Some farmers here have sown shrivelled wheat and have declared that they could see no difference between the crops raised from such seed and those raised from good plump seed. Such conclusions are of no value whatever unless the experiments have been conducted simultaneously, upon soil alike in every respect, and weights, measurements, and comparisons of the competing crops have been most carefully taken. It would be a strange thing indeed if wheat should be the exception to everything that has been cultivated during centuries. It has been the accepted rule that "like produces like," and that the best seeds of all plants and the best animals of all live stock must be selected for propagation and cultivation. These remarks are very seasonable, because the present is the proper time to select seeds of our various crops for next season's sowing. Only the finest and best heads of maize and sorghums should be selected for seed purposes; and the same holds good in respect to cereals and all other crops that are grown.

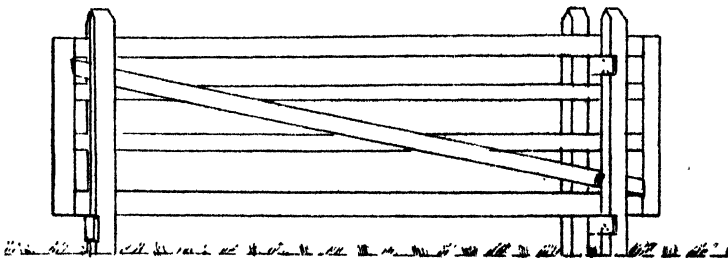
### CHEAP FARM GATES.

"Time is money," says an ancient proverb. Some people lose a great deal of time in taking down and putting up slip-panels, or tying knots in wires, where they could quite easily substitute a cheap gate, which could be opened in half a minute and be effectually closed within as short a time. For ingress and egress to or from a paddock seldom used for vehicular or other traffic a simple contrivance like this would be much handier than the clumsy slip-panels:—



Here it will be noted that the wires have been cut alongside one of the posts and affixed to an iron bar or stout stake, pointed at the lower end. The wires are securely fixed, at the proper distances apart, to the bar or stake. When opened, the pointed end of the stake is placed in a hole in the end of a stump sunk in the ground at a convenient spot; and when the panel is closed the lower end of the bar or stake is held in a loop of wire fixed to the adjacent post, whilst the top is fastened by a clamp or loop.

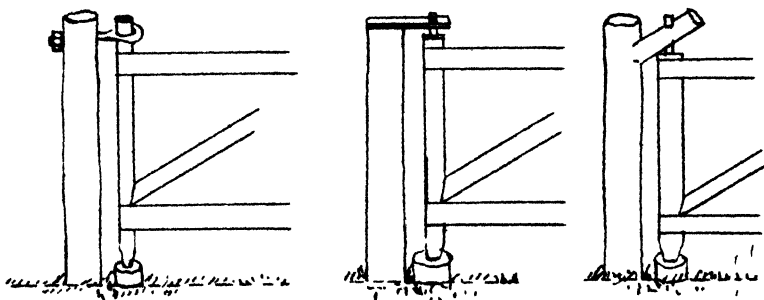
The next idea is the writer's improvement upon an American sliding gate:—



This requires two posts at each side. In place of hinges the gate slides upon two short bars affixed to two posts set at an angle. It would be better to

substitute a couple of rollers. At the other end the gate, when shut, slides between two posts, set opposite to each other, and rests upon a short bar or support. The reader is supposed to be standing inside the enclosure, and if he wishes to open the gate he will slide it along to the right until half the length is reached, and then he will walk backward to the right until the gate stands at right angle with the two posts. This gate may be made of deal or round rough timber, but the top and bottom rails should be of straight wood. The artist has made a slight mistake in the drawing. The diagonal strut of the gate should be affixed to the under side of the top rail, and not to the dropping style, or end piece. Where barbed wire is used in the fence, the hanging style and the dropping style (or two end pieces) of ordinary gate should be extended above the top bar and the bottom bar, so that barbed wire may be stretched at both bottom and top of the gate, to prevent pigs crawling beneath the gate, or horses and cattle stretching over the top.

The necessity for hinges can be done away with by adopting devices similar to these shown below :—



In every case the hanging style of the gate rests upon a short stump, buried in the ground and bored to receive it. The hanging style should preferably be made of hard wood, or, if of soft wood, should have a shoe of iron, or be provided with an iron peg. In some cases the top of the hanging style is retained by an iron loop; in others, either an iron peg or the end of the style is retained by a block of wood, or a staple, or by a natural limb of the tree forming the post.

## THE FARM.

### SEASONABLE NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL ROSEWORTHY  
AGRICULTURAL COLLEGE.

The harvest is past, and let us hope the last of the series of dry years which has befallen us has gone with it.

There is now a time on the average farm when work may proceed more leisurely, and when many odds and ends may be attended to. For example—dam-sinking may be done; dams, unfortunately already dry, may be cleaned out; fencing put in thorough repair; gates made and hung; buildings white-washed; doors, gates, &c., painted where necessary, or tarred; harness overhauled and repaired; and implements and machines cleaned, repaired, and painted.

If rain falls during the summer the fallows should have the benefit of a

light working following immediately on it. Excellent results follow the practice of having all the teams at work as often as the land is in nice working condition. Every instance of such working tells to advantage in the succeeding crops, and is profitable. After summer rains, and where the land can be ploughed in summer, even in the absence of rain, it is found to be good practice by many farmers to lift land lightly that is intended to be thoroughly fallowed in the succeeding winter. The first rains go into such prepared land well, and a better germination of weeds to be ploughed in with the first fallow furrow is secured. Some lands, indeed many lands, suffer from being ploughed dry, and the working is in other instances not remunerative, but after rains it is all gain to have every horse on the farm at work as long as the land continues to work lightly.

Men who are fortunate enough to have summer crops succeeding will take the opportunity to run the horse hoe through them now. On the College farm these crops have again failed. Nothing, not even stinkwort, will grow in the face of such drought.

Where maize has succeeded it will be fit for chaffing for silage in January and February, and where there is more than is required for immediate use this is an excellent way in which to conserve the excess. Where irrigation or the climate allows of successive sowings it is to be preferred to feed each block as it matures.

In most districts where there is feed on the pastures now it is dry or beginning to get dry, and it is very important for men who make dairying a prominent part of their practice, to avoid letting the milk yields go down by using such dry forage. Ensilage made in the spring should be fed right away if summer crops are not available. If dry feed has to be resorted to at any time let it be later in the year, but in the meantime it is to be endeavored to keep up a supply of succulent forage for the cows in milk.

Sheep, where there is a supply of water, may be turned on stubbles, and will be found to go along splendidly as long as the stubbles and water hold out. I referred above to the desirability of going over the implements thoroughly at this time of the year. Of course it is not suggested that in the busiest season one may be contented to go on with implements with bolts loose, bearings worn, and wheels describing tortuous courses. "A stitch in time saves nine," for one part loose or disjointed involves abnormal wear on other parts, and neglect of a small breakage or loosening when it first occurs may lead to considerable expense on the implement later which might have been avoided. We do not always realise the amount of capital represented by the implements on an average farm. It will be readily granted that £400 makes no extravagant display in the implement shed of even a relatively small farm, and a farm of 1,000 acres cannot be sufficiently equipped with modern implements necessary for the best results for less than twice that amount. There is and has been a very rapid evolution of agricultural implements, everyone knows, during the last few generations, and second-hand implements are often out of date. It is thus good judgment to buy the best in the first instance, not necessarily some new unapproved invention, but a machine of the type which well-informed practice has put to the test and approved. Often, also, and that more especially in complicated machines, a second-hand implement is a dear purchase. One may take it that on the average the implements on the farm represent £450 to £500 capital. To lessen the annual depreciation of this equipment becomes an important item in successful management, and the £20-note which may be saved is appreciable to an agriculturist, even in times the least depressed.

Now is the time to clean up implements thoroughly, to grease wearing surfaces, to clean bearings, to dissolve off old cloggings, to renew parts that

seem likely soon to give way when put into use, and to have the implement painted and carefully shedded. I find chocolate a good color for farm implements. I tried it extensively after reading an article by Primrose McConnell, in which it was recommended as one of the best colors for use on the farm; and I am satisfied that it wears well. It is not gay or gaudy, but it does not so readily change as some colors more generally adopted.

Time can also be found on many farms to burn lime during the next few weeks and add it to the claypans and patches of stiffest soil. I believe carting the fine limy powder underlying the mallee so generally and spreading it on the claypans without burning will be found profitable; and a few slack days might be usefully occupied at this work, though of course the benefit is not in any way so marked as by the use of quicklime.

## FRESH v. ROTTED FARMYARD MANURE.

In careful experiments conducted at the Canadian experimental farms during nine years it has been found that barnyard manure gave better results right through than any commercial fertilisers, though a considerable variety of the latter were tried. Careful tests were made during the nine years of the relative effects of fresh and rotted barnyard manure, and the following are the average results:—

	Wheat	Barley.	Oats.
Well-rotted manure .....	19·36½bush.	32·36½bush.	43·24bush.
Fresh manure .....	19·29bush.	33·43bush.	50·8½bush.

The area of the plots was one-twentieth of an acre (2 sq. rods); at the rate of 15 tons of manure per acre being applied. In each case the yield of straw from the plots manured with fresh manure was greater than from the rotted manure. The manure was a mixture in nearly equal proportions of horse and cow dung, and was lightly ploughed under as soon as possible after being spread. With maize and carrots fresh manure appears to give best results, but with mangolds and turnips the result is the other way. In individual years the results differ somewhat, but the average for the whole series is as shown. In an analysis of fresh and well-rotted manure it was found that 8,000lbs. of manure shrunk in weight in one year to 2,659lbs., and that while the well-rotted manure was, weight for weight, richer than the fresh manure, the loss in rotting more than counterbalanced this. In 8,000lbs. of fresh manure there was found 41·6lbs. nitrogen, 24·8lbs. phosphoric acid, and 60·8lbs. potash, against 23·6lbs. nitrogen, 19·5lbs. phosphoric acid, and 39·8lbs. potash in the 2,659lbs. of rotted manure.

## TREE LUCERN (CYTISUS PROLIFERUS).

Amongst the many plants introduced into South Australia during the past fifteen years for fodder purposes, probably the so-called "Tagasaste" has excited as much interest as any, and many extravagant virtues have been claimed by its enthusiastic advocates, while it has been as heartily condemned by those who have failed with it.

The late Dr. Schomburgk, when director of the Adelaide Botanic Garden, introduced *Cytisus proliferus* to South Australia under the name of "Tagasaste," and for many years it went under this name. It was found, however, that the true Tagasaste was another variety, *Cytisus palmensis*, and the name of *C. proliferus* was altered in this colony to "Tree Lucern," which was considered appropriate, and by this name it will be referred to. In the Canary Islands it

is known as "Escabon," and, according to authorities, is regarded as being of less value than the true Tagasaste, which is a very leafy plant, and almost destitute of the silky whitish hairs of the tree lucern.

Like all Canary Island plants, both varieties send down very long tap roots deep into the soil, and are thus enabled to withstand long periods of drought. Light open soils are most suitable for its growth; stagnant water about the roots is fatal; and frost will severely injure the young plants. As a fodder plant it has been condemned by many in Australia without giving it a fair trial. As with many other valuable foods, stock frequently do not take very readily to it at first, but after they become used to it they eat it greedily. As a break-wind for garden or orchard it is one of the best of plants, being a rapid, thick grower, and even close to the sea stands the cutting winds without any apparent injury.

The accompanying illustration is from a photograph of a six-year-old hedge at Mr. A. B. Robin's homestead, Paragrove, Nuriootpa, and shows the habit of growth and size in suitable soil. As will be noticed, the bushes are laden with blossom, which supplies splendid bee forage, and the lower part has been eaten away by horses and cows.



Mr. Robin furnishes the following particulars concerning the cultivation of this plant, and his experience with it as a fodder plant.

*Propagation.*—Seed should be sown during the summer months in sheltered beds where the plants can be attended to. It is a good plan to soak the seed in hot water previous to sowing; but in this case care must be taken to keep the soil moist, or the seed will malt. By sowing in the summer when the ground is warm, strong plants will be obtained for setting out in June or July. Plants should not be set out, however, until 5in. or 6in. high. Another method is to sow the seed where the plants are to remain, putting in about six seeds in each place. Any surplus plants may be removed to fill up blanks or to extend the plantation.



*Soil.*—Light sandy soils are especially adapted for tree lucern, which, however, also thrives well on limestone, gravelly, or any loamy soil, provided the drainage is good. Stiff clay or other heavy soil and rich moist alluvials are most unsuitable. Any excess of moisture is fatal to the plant. Owing to it being slow of growth during the first year, there is no danger of the plant becoming a nuisance on land required for other crops, as by turning stock in on the young plants when other feed is scarce, they will be eaten out of existence.

*Uses.*—This is one of the best of breakwinds, and for this purpose should be planted in a single row about 6ft. apart, and at least 25ft. from the nearest fruit-trees or vines. The trimmings will make a considerable quantity of useful feed. For fodder purposes only, plant about 3ft. or 4ft. apart each way. When the plants are once established they make rapid progress, and yield heavy crops of nutritious fodder. Horses, cattle, and sheep become very fond of it, and do well on it. In dry weather, Mr. Robin states he feeds his horses almost exclusively upon it, and the saving in cost of hay, especially when at £6 per ton, is great. Stock require some time to get used to it in many cases, and, if offered old, woody stuff, will refuse it unless nearly starving. It is most important to remember that to get young succulent growth the bushes must be kept well cut back. During the last quarter of the year, when it is in seed, it is not so suitable for feeding. Many farmers in the drier parts of the colony have reported favorably on the value of tree lucern, and even during the excessively dry seasons just experienced it has made good growth. Failure is generally due to want of knowledge as to soil, treatment, &c. As a honey-producer this plant deserves the attention of apiarists, as it blooms freely when other flowers are scarce, and remains in blossom for a long time.

Mr. C. Grieve, of Grieveston, Taro, in writing to Mr. Robin about this fodder in May last, said—"I have experienced no difficulty in getting horses, cattle, and sheep to eat it, and only regret I have not 500 acres planted. It is simply marvellous the way it resists drought and keeps on growing. I believe it to be one of the best of fodder bushes. A good many people have told me their stock will not eat it, but I have seen horses refuse the best of green lucern when first fed to them. With tree lucern many cut off a branch and offer it their horses, and because it is not eaten straight away they condemn it."

As an ornamental plant, tree lucern is worthy of a place in every shrubbery.

**CATERPILLARS.**—It has been stated that the following will prevent injury to cabbages, grass, and other plants by caterpillars, which travel in myriads from field to field:—Slack 100lbs. lime, sift it through a fine sieve, and mix thoroughly with 1lb. of Blundell's pure Paris green. Sprinkle this mixture over every part of the plants likely to be affected. Gas tar, 1lb. poured drop by drop into 5galls boiling water, constantly stirring till all is dissolved; then mix with 100galls water, and sprayed on all parts of the plants, will keep the caterpillars away.

**CABBAGE CATERPILLARS.**—Dr. Jas. Fletcher, F.R.S.C., &c., Entomologist to the Canadian Department of Agriculture, reports that few insects are more readily controlled than the caterpillars of the small white cabbage moth (*Pieris rapæ*). The best remedy is Pyrethrum powder mixed with four times its weight of common flour, and then kept in a tightly-closed vessel for twenty-four hours until the poisonous principle has permeated the whole mixture. A small quantity of this mixture dusted over the affected plants very quickly destroys the caterpillars, as Pyrethrum or insect powder kills by contact either dry or as a decoction.

## DEPARTMENTAL NOTICES.

## AGRICULTURAL COLLEGE, ROSEWORTHY.

## COUNCIL.

John Langdon Bonython, Esq., J.P. (President School of Mines and Industries), Chairman.

Thomas Hardy, Esq., J.P.

F. E. H. W. Krichauff, Esq., J.P., F.R.H.S. (Chairman Agricultural Bureau).

James McLachlan, Esq., M.P.

Alexander J. Murray, Esq.

Lionel W. Stanton, Esq. (Chairman Board of Inspectors).

## STAFF.

Principal: William Lowrie, M.A., B.Sc., Edin.

Viticulturist and Oenologist: Arthur J. Perkins, Diplômé de l'Ecole d'Agriculture de Montpellier.

Housemaster, Lecturer on Natural Science, Teacher of Book-keeping, and Secretary: J. A. Haslam, B.Sc.

Lecturer on Chemistry and Physical Science: W. R. Jamieson, B.Sc., Lond.

Assistant Viticulturist: Ewen F. McBain.

Teacher of Surveying: L. Bosworth.

Teacher of Farm Blacksmithing and Carpentry: J. L. Williams.

## SESSIONS.

The course of study extends over nine sessions, or three years. The *first session* of each year begins on or about the second Wednesday in February, and closes on or about the second Friday in June. The *second session* begins on or about the last Wednesday in June, and closes on or about the last Friday in September. The *third session* begins on or about the first Wednesday in November, and ends on or about the first Friday in February.

Subjects—Agriculture, Health of Stock, Viticulture, Fruit Culture, Wine-making, Mathematics, Elementary Sciences (Physical and Natural), Book-keeping, and Surveying.

Manual Practice on Farm, Vineyard, Orchard, and in Dairy, Wine Cellars, and Farm Workshop.

First Session of 1898 opens on or about February 9. Fees, £30 per annum, including Board and Lodging. Six Scholarships annually open for competition in February; one to each of the following districts, viz.:—(1) Adelaide and suburbs, (2) Central District, (3) South, South-East, and Western districts, (4) Mid North and Yorke's Peninsula district, (5) Lower North district, (6) Far North district. Competitors must be not less than 15 nor more than 18 years of age, and must compete in that district in which is situated the school last attended. Full particulars obtainable on application at office of Minister of Education and Agriculture.

J. LANGDON BONYTHON,  
Chairman Council of Agricultural College.

## AGRICULTURAL SCHOOL.

(Old Exhibition Grounds, Frome-road, Adelaide.)

Head Master: Mr. Andrew Ferguson.

Boys of 12 years of age, who have obtained a Compulsory Certificate, or 13 and upwards, without it, are received at this School, and instructed in the following subjects:—Advanced Arithmetic, Algebra, Plane Geometry, Mensu-

ration and Land Surveying, Mechanical Drawing, Composition, English Literature, Agriculture (Theoretical and Practical), Fruit Culture, Viticulture, Chemistry (Theoretical and Practical), Carpentry and Smith's Work.

The course is so designed as to fit boys to enter the Agricultural College, at Roseworthy, or the School of Mines and Industries, when they reach the required age. The classes in Chemistry and Carpentry are conducted at the School of Mines.

Fee, 1s. per week.

### PRODUCE EXPORT BRANCH.

Port Adelaide Depôt: Ocean Steamers Wharf.

London Depôt: Mill Buildings, Upper Thames-street.

The object of the department in establishing these depôts is to afford to the agriculturist a ready means of finding new markets for his produce.

By combining their shipments, small producers are enabled to forward their produce at the same rates as those which are charged on wholesale consignments.

The department will, when required by the consignor, undertake to receive and prepare produce for shipment, engage freight, insure, ship, and arrange for selling in the world's markets.

By means of the facilities afforded by the department, not only have more satisfactory prices been obtained by producers abroad, but a congested home market has been relieved.

The depôt at Port Adelaide is fitted with refrigerating machinery of the most approved type, and provided with extensive cool storage accommodation, and has been largely used by producers to ship butter, lambs, pork, poultry, fruit, wine, and various other products.

Further additions will shortly be made to the depôt, which will enable the department to deal with 800 lambs per day, and will have space to store from 12,000 to 15,000 carcasses, so that every advantage can be given to shippers for shipping large quantities of frozen meat.

Since the first shipment of lambs in 1895, this industry has made considerable strides. Last season 10,666 carcasses of lambs were shipped to London, and the prices obtained have been on the whole satisfactory.

There is every reason to believe that there will be a very large and profitable export trade in rabbits. The season commences at the beginning of March. The actual cost of placing a rabbit on the English market is from 2½d. to 4½d., according to the size, and whether shipped in the fur or skinned, so that from 6d. to 9d. each in London should leave a sufficient margin to induce the establishment of a permanent trade.

In consequence of the care exercised by the depôt officers in handling and shipping fruit, the export of apples has made considerable progress. For particulars as to most suitable varieties to export, cost, &c., see article on "Export of Fresh Fruit in the *Journal of Agriculture and Industry* for January."

The manager of the London depôt writes, saying that during the last six months a very considerable number of new customers have been obtained for the depôt wines.

Our wines are making splendid progress in Liverpool and Glasgow, and many of the best London restaurants are selling the wines. Encouraging accounts also come from India, and agents express themselves as well satisfied with South Australian wines.

In the case of persons having no agents in England, the department will undertake the sale of any produce consigned through the Export Dépôt; and as soon as the account sales are received a copy thereof, together with a remittance for the net result, will at once be forwarded to the owner of the goods.

Goods intended for sale through the London dépôt are carefully examined by Government experts, who, when satisfied with the quality and mode of packing, give certificates to this effect, which, together with the shipping documents, are dispatched to the manager of the London dépôt. The desire of the Government is to raise the quality to meet the requirements of the English market, which is calculated to result with advantage to the producer and the reputation of the colony generally.

Information as to the resources and trade of South Australia may be obtained in London from the Hon. Thomas Playford, Agent-General, or from Mr. E. Burney Young, the manager of the London dépôt; and details with regard to the working of the Export Branch and Dépôt, at Port Adelaide, from the manager.

#### SOUTH AUSTRALIAN SCHOOL OF MINES AND INDUSTRIES, NORTH-TERRACE, ADELAIDE.

##### MEMBERS OF COUNCIL.

J. Langdon Bonython, Esq., J.P. (President).  
A. Adamson, Esq., J.P.  
Hon. J. G. Bice, M.L.C.  
Professor Bragg, M.A.  
Hon. D. M. Charleston, M.L.C.  
L. Grayson, Esq., J.P.  
R. Hooper, Esq., M.P.  
J. C. F. Johnson, Esq., A.I.M.E.  
A. Poynton, Esq., M.P.  
R. E. E. Rogers, Esq., J.P.  
Theo. Scherk, Esq., M.P.

##### STAFF.

Professor Tate, F.G.S.  
S. Hughes, B.Sc., Registrar and Curator of the Museum.  
A. J. Higgin, Metallurgical Instructor.  
Thos. Forsaith, Mechanical Instructor.  
E. W. Hawker, M.A., Mining Instructor.  
W. S. Mackenzie, Wh.Sc., Engineering Instructor.  
J. Dalby, B.A., Mathematical Instructor.  
G. A. Goyder, F.C.S., Analyst and Assayer.

The school year consists of three terms. The first term of 1898 will commence on February 14th.

The Council grant diplomas of Associate of the School in the departments of Mining, Metallurgy, and Mechanical Engineering.

Two entrance scholarships are offered for competition in February of each year, one for intending regular day students and the other for intending regular evening students.

Concessions in railway fares are granted to students attending the school.

Further particulars may be obtained on application to the Registrar, North-terrace.

By direction of the Council,

J. LANGDON BONYTHON, President.

### AGRICULTURAL AND HORTICULTURAL SOCIETIES— GRANTS-IN-AID.

Office of the Minister of Agriculture, Adelaide, December 17, 1897.

Applications from Agricultural, Horticultural, and Field Trial Societies claiming to participate in the vote for aid to such societies should be forwarded before January 31, 1898. The balance-sheet sent with the application must be for the year ended December 31, 1897.

The prize-list for current year should be sent when published.

JOHN A. COCKBURN, Minister of Agriculture.

### PHOTOGRAPHS ILLUSTRATIVE OF LOCAL INDUSTRIES.

Prizes of £5, £3, and £1 are offered for the best set of six photographs, half plate size or over, illustrative of the export industries of South Australia. The competitive collections are to be sent in any time before noon of the 31st March, 1898, addressed to the Department of Agriculture, Adelaide, enclosed in an envelope, and marked with a *nom de plume* on the lower portion of the left-hand corner. The name of the competitor must be enclosed in the envelope. The photographs must illustrate some stage in the growth preparation or manufacture of articles for export, and may deal with one industry or with several industries. No prize will necessarily be awarded.

### AGRICULTURAL SCHOOL.

On Wednesday afternoon the distribution of prizes to the pupils of the recently-established Agricultural School took place in the schoolroom, Old Exhibition Building. Those present included the Minister of Education and Agriculture (Hon. Dr. Cockburn), the Hon. Gregor McGregor, M.L.C., Messrs. J. Miller, W. H. Carpenter, J. W. Castine, F. J. Hourigan, and I. MacGillivray, M.P.'s, Mr. L. W. Stanton (Chairman of the Board of Inspectors), and Inspector Whitham.

The HEAD MASTER, Mr. A. Ferguson, read his annual report, as follows:—

In presenting the first report of the school, I am pleased to state that since the opening day the attendance has been steadily increasing. We began with nineteen boys on June 7th, and we have now an average attendance of more than forty. In all sixty-six boys have passed through the school, and our roll number is now fifty-seven. The school is intended to bridge over the gap existing between our public schools and the Roseworthy Agricultural College and the School of Mines and Industries. And while hoping that many students will find their way to these institutions, we also hope to keep in touch with our public schools. The school is receiving much support from practical men, who see the possibility of the institution doing good work in the direction of manual training and fitting boys for occupations other than clerks. The need of a special agricultural education is now generally recognised. Farming is becoming more and more a profession which demands special skill, and calls forth all the natural resources a man possesses, and he will best succeed whose previous training has been such as will enable him to use his skill to the best advantage. An education including an elementary knowledge of the sciences is very desirable for every boy for its own sake, but it is absolutely necessary if he is to be placed at an Agricultural College where the sciences are taught. We do not attempt, nor is it desirable, to turn out carpenters, chemists, entomologists, or expert botanists. By science teaching we wish to train boys to observe accurately, to reason carefully, to be honest and truthful, to judge dispassionately, and to avoid hasty generalisations. We wish to teach them to be self-reliant and self-sacrificing. Let me refer now to the work done at the school during the last six months. We began late in the year, the boys had done very little manual labor, and were mere novices with the spade, but with that enthusiasm so characteristic of youth, they set to work with great vigor, and as a result they now do very satisfactory work, and are greatly benefited by this outdoor work physically and

mentally. Great interest has been taken in the experimental plots in the field, all of which were carefully attended by the pupils, and much valuable information was gained in watching the progress of the growing crops. Good practical work has been done in vine-pruning and cultivation. The vineyard at the Asylum was placed at our disposal, and a splendid lesson on pruning was given the boys by Professor Perkins. On several occasions since the vineyard has been visited, and, assisted by Mr. Quinn, many valuable hints have been acquired in vine-pruning. We have established nursery plots in connection with the orchard, and intend to rear all the trees we require. Practical lessons in propagating fruit trees by grafting and budding will be given. Mathematics, drawing, arithmetic, and mensuration occupy a prominent position on the timetable, and spelling and composition are not neglected. Chemistry and carpentry are taken at the School of Mines and Industries. The work is thoroughly enjoyed by the pupils, and very good progress is being made in both subjects. What I shall now have to say will be of special interest to the boys. As most of you are aware, we have just passed through the ordeal of an examination, and as usual some have acquitted themselves well and others not so creditably. The examiners were Professors Lowrie and Perkins and Messrs. J. A. Haslam, G. Quinn, and A. E. G. Reynolds.

The dux of the school is Lloyd Higginbottom, who wins the prize presented by Mr. J. Darling. Tom Whillas was a good second, and was only a few marks behind. Ernest Hubble secures first prize in the II. Division and Leslie Furlong in the I. Division. The prize for fieldwork, given by Mr. Norman, was won by John Adams, of Smithfield. Spencer Ising obtained the highest number marks in the examination bearing directly on the work done on the field, and wins Mr. Norman's prize. Tom Whillas obtained the highest number of marks in agriculture, viticulture, and fruit culture, and so takes Mr. Miller's prize. The good-conduct prize, presented by Mr. W. C. Rigby, goes to Frank Bachelor, of Salisbury. This award, I think, will give general satisfaction. Charles Gilbert obtained the highest number of marks for homework. Tom Whillas obtained Dr. Cockburn's prize.

The MINISTER OF AGRICULTURE, after expressing his pleasure at the satisfactory nature of the report, said the school was one of those little germs that, like the famous mustard seed, would grow into a great tree. There were not many boys at present in the school, but there were more than it was prophesied they would have. Every new movement, whether for good or evil, had its enemies, who said that it was a "fad," and would not succeed; but, as was usual, he was glad they had falsified the croakers. They had started with nineteen boys, and now there were fifty-seven boys. Nine had left, but the majority had gone because they had secured work to do; and he believed what they had learnt in the school had placed them in a less unfavorable position for employment than they otherwise would have been, and he looked forward to the time when any young man who had been a pupil at the school would be sought after; because at the school they would have practical education which would teach them useful things, and which would give them good judgment and powers of discernment. The present school was only one of the many schools that were to be started. Mr. Miller might be said to be the father of the system, and he had the co-operation, among others, of all the members present. It was not enough to teach the children the three R's, which was done at the primary schools. If they were going to be a great nation, they must take the pupils a good deal further. When that school had been proved beyond all possibility of doubt a success, and the other schools at Jamestown, and he hoped at Naracoorte, had been proved to be a success, then they would scatter the schools right through the country; and, whenever there was a primary school in an agricultural or industrial district, there would be a chance for the boys going on and getting a secondary education. If Great Britain and her colonies were not going to lose their place in the race, they must see to it. At present they had competitors outpacing them at every stride. Germany was upon their heels, and if they did not take care she would pass them. Germany was accelerating her national advance by liberal, industrial, technical education, so that wherever there was an assembly of boys there was a standpipe of knowledge from which the waters of life could be drawn by everyone who was thirsty for information. It should be the same here, and it should never

cease until everyone was satisfied. Wherever boys could learn, it should be the duty of the State to give them the opportunity to do so. He thanked the School of Mines and other institutions which had assisted the school. Every inducement would be given to those at other schools to attend the Agricultural School for two or three days in the week, and take part in the work. He thanked those who had given prizes, and he himself would give a pound's worth of carpenter's tools to the boy who was selected by his comrades.

A referendum was taken, and the prize fell to T. Whillas.

The Hon. G. MCGREGOR, M.L.C., and Messrs. I. MACGILLIVRAY, J. W. CASTINE, F. J. HOURIGAN, and W. H. CARPENTER, M.P.'s, spoke eulogistically upon the management of the school, and the advantages that would be derived by the pupils and the colony generally from the institution.

Master L. HIGGINBOTTOM, the dux of the school, thanked the visitors for their attendance.

The MINISTER OF EDUCATION expressed his thanks to the Board of Inspectors for the way in which they had interpreted what they believed to be the wishes of the Legislature in regard to the school. They had spared no time or trouble in the matter. He mentioned that next year there would be two assistant teachers in the school who would be able to assist Mr. Ferguson, and they would acquire such knowledge of the methods of the school that they would be able to go into the country and assist in the schools to be established there.

Mr. L. W. STANTON said he was pleased their small efforts to find out the requirements of the school had met with appreciation. They had taken a great deal of interest in the school, because it was established very shortly after they came into office.

Cheers were given for the Minister, the Inspectors, and prize givers, and the Head Master, and before leaving the visitors inspected the work of the scholars.

### FARM PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

December 23rd, 1897.

The wheat harvest, such as it is, has been gathered throughout the earlier and drier portions of the colony, with the result that even the low estimate previously formed has hardly been realised, some districts that a little time ago were expected to give three or four bushels hardly doing more than returning seed. On the other hand, the Hills and South-East districts, the latter especially, are having one of the best seasons ever experienced. As they do not, however, go in extensively for wheat, this will but little influence the season's average, which throughout the colony now, in the conflicting opinions of experts, seems to be somewhere between 3bush. and 3½bush. Preliminary arrangements have been made to provide farmers with seed for coming season in districts that have this year again proved a failure. Whatever other faults may be found with our agriculturists in the drier parts of the colony, they are not deficient in pluck and hopefulness, and well deserve the reward that may be their portion should this prove to be the last, as prophesied by some, of the present cycle of dry seasons. With early rains, the probabilities are that we shall have an increased area sown. Meanwhile, we must wait for the breaking up of the present drought before further speculating upon the possibilities of the future.

The wide difference existing between buyers' and sellers' ideas of value of wheat that we referred to in our last has scarcely yet been bridged over, so that little business is passing.

Flour has eased about 20s., whilst offal lines are also slightly lower, with prospect during coming month of considerable reduction, as mills throughout the country districts resume operations. Growing feed generally is good, even in many parts where the crops have failed; the decimation of stock a year ago of course will largely account for this. Local supplies of potatoes have barely kept the market filled. Onions, rather plentiful. A little old wheat has changed hands at 5s. to 5s. 2d.; new from 4s. 6d. to 4s. 7d. Flour, £11 10s. to £12; a little old being sold up to £13. Bran and pollard, 1s. 3d. Chaff, from £4 5s. to £4 15s. per long ton, bags in, dumped, f.o.b., Port Adelaide. Local oats are selling at 2s. 3d. to 2s. 6d. for White Champions, Dun slow at 2s. Potatoes, £6 10s. to £6 15s. Onions dull, at £3 to £3 10s.

## DAIRY PRODUCE.

The comparatively high prices ruling in this colony for butter during November caused over-border buyers in the Barrier and river districts to transfer their orders to Victoria, where values were much lower, with the result that during this present month, although supplies locally have been steadily shrinking, prices continued to ease. Within the past few days reaction has been experienced and recovery effected to rates ruling at beginning of month, with prospects now of steady tendency to higher figures, as a result of the continued dry weather. Heavy demand for eggs for West Australia well sustained values until about a week ago, when, Christmas orders having been shipped, a lull occurred, local buyers only operating. A drop of about 1½d. was shown. This, however, usually occurs, and for the next few weeks the line may be expected to rule easy, but average values during this season has been exceedingly satisfactory to consignors. Seasonable active business has been doing in cheese, bacon, and hams; honey finding very ready sale; beeswax brisk. Almonds are quiet. The usual Christmas month trade in poultry has been actively demonstrated this season, and prices, under the influence of export buyers for the West, ruled very high in all except geese, for which, however, fair prices for good birds have been obtainable.

To-day ruling values are:—Factory and creamery fresh butter in prints, 11d. to 1s. 0½d.; private separator and choice dairy lots, 9½d. to 10½d., well-packed store boxes and medium dairies, 8d. to 9½d.; heated, stale, and inferior, 7d. to 7½d. Hen eggs 8d., duck eggs 9d. Favorite brands of South Australian cheese, 7½d. to 8½d.; medium grades, 6½d. to 7d.; prime matured being scarce, a little New Zealand is changing hands at from 9d. to 10d. for fine quality. Sides of factory-cured bacon from 9½d. to 9¾d.; farm fitches, well dressed, 8½d. to 9d.; hams from 9½d. to 1s., according to size and quality. Clear extracted honey 3d.; beeswax, 1s. 1d. Softshell almonds, 3d., kernels, 6d. to 6½d. In poultry—Hens sell at from 1s. 5d. to 1s. 9d., chicks, 1s. to 1s. 4d.; roosters, 1s. 8d. to 2s.; prime heavy to 2s. 8d. Ducks, 1s. 10d. to 2s. 3d., large fat birds, to 3s. Pigeons, 6d. to 7d. Poor to medium geese, 3s. to 3s. 3d.; good to extra fine, 3s. 6d. to 4s. 6d. Turkeys from 8d. to 9d. for medium sorts, fine table birds to 1s. 1d. per pound, live weight.

## WEATHER AND CROP REPORTS.

AMXTON.—The weather during the month has been seasonable, though at times very hot. Reaping is nearly finished, the yield averaging about one-half the amount put in as seed. The sample, though somewhat shrivelled, is fair. Stock are in good condition. Rainfall for November, 0.245in., December 0.315in.

BOULEROO CRTILE.—Some farmers have finished reaping, with yields of from 3bush. to 15bush. per acre in favored spots. December 13th was the hottest day experienced here for years.

BOWHILL.—We are having splendid reaping weather, and farmers are getting their crops harvested as quickly as possible. Some crops are returning 12bush. while others give only 4bush. per acre, so that the average is uncertain at present. Feed will be more abundant than last year, and stock in better condition.

GAWLER RIVER.—The weather continues very dry. Stripping is nearly finished, the returns varying from 3bush. to 16bush. per acre, the former being common, the latter very seldom heard of. The grain is more or less pinched, but saleable without reduction. Feed is fast diminishing, and stock are beginning to fall off in condition. Summer crops are almost a total failure. Orchards and vineyards are suffering severely, and the fruit will be small. Bees are not doing well, owing to trees failing to blossom freely. Rainfall for November 0.460in.

GUMERACHA.—Haymaking is just finished, and farmers are now busy stacking hay of good quality; returns about same as last year. The seed drill has given satisfaction where used. Weather dry and hot. Feed is dying off and milk yield decreasing fast. Caterpillars have done a large amount of damage to pea, potato, and fodder crops, and the yield will be very light. The latter are a total failure in some cases. Wheat yield will be very good, with excellent sample.

LUCINDALE.—The past month has been a very seasonable one, both for shearing and harvesting. The first is now completed and the latter in full swing. The hay crops are exceptionally good, and the grain harvested will also yield well. Feed is plentiful and stock are now in prime condition. "Grubs" are unusually plentiful, and are working havoc on the summer crops—potatoes, onions, maize, rape, &c.

MAITLAND.—The weather has been very hot and dry, no rain having fallen for the last three months. Many farmers are now water-carting, but the crops are better than last year. The average will be about 4bush., not more. The manured and drilled crops have considerably helped to make this average, as there are a good many 2bush. crops



about. Fruit gardens are suffering severely from the past dry seasons, and some of them have more dying and dead trees than living ones. Vineyards are also feeling the drought greatly; some varieties of vines have set little or no fruit. Stock in good order.

MEADOWS.—The yield of hay has been very good, but the absence of rain during past six weeks has practically ruined the summer fodder crops.

MOUNT BRYAN EAST.—Hay crops proved very light, not more than 5cwt. per acre. The wheat crops will return very little more than seed.

MOUNT COMPASS.—Weather has been very dry, and rain is badly needed. Potato crops are generally looking well, but other garden produce is very parched. Stock are doing well.

MOUNT PLEASANT.—A quarter of an inch of rain has been recorded since last report, and the heavy winds following have done some damage. The grain will be small. Stock are doing well.

NANTAWARRA.—Rainfall for month, 0.280in. The rough boisterous weather experienced during the past month has seriously damaged the ripe cereal crops.

PINE FOREST.—The weather has been hot, with occasional cool changes and high winds. Harvesting operations are progressing slowly on account of cool changes. Owing to recent dry weather, the yield will be light; in many cases the grain is badly shrivelled. Hay cut about 5cwt. to acre. Average wheat yield for district, 2½bush. Rainfall 0.070 for two months.

PORT ELLIOT.—December keeps up the character of the season for heat and dryness, but farmers have had good weather for getting in their hay. Caterpillars have been very troublesome, stripping potatoes and other green things, no even leaving the onions. Apricots, plums, and pears promise a good return; but the apple crop will be below the average. The harvest is now about finished, and the average will be light. Weather has been hot and very dry. Stock is in fair condition.

RIVERTON.—Haymaking is practically over, with fairly good returns. About 2,000 tons have been purchased in the field by chaff merchants, and stacked near the town. Reaping has commenced on some farms, and the first wheat of the season went 63lbs. to the bushel after a special winnowing, the grain being slightly pinched.

SADDLEWORTH.—As a result of the deficiency of lin. in the October rainfall, the wheat is in many cases pinched, and the yield will only be about three-fourths of what was expected. Reaping is about finished, but the heaps have not yet been cleaned. The hay crop is estimated at nearly 1 ton to the acre, and has been stacked in splendid order. Caterpillars have been very destructive in the garden and among the sorghum; the latter, where uninjured by the "grubs," is standing the dry weather well. Rainfall for November, 0.800in.; for eleven months 15.040in.; average (for seventeen years) 18.566in., for December to 22nd, 0.050in.

STEWED PEACHES.—At the Mildura competition, Mrs. J. B. Ritchie and Mrs. J. E. Holmes divided the prize for the following preparation:—Half a pound of dried peaches washed in cold water, then put into an earthenware dish with 1½ pints water, and soak for twenty-four hours. Drain off the water, add half a pound white sugar, and boil hard for ten minutes in an enamelled saucepan. Strain the juice through double butter cloth, add the fruit, and simmer gently for three-quarters of an hour, place in your dish and serve hot or cold, according to taste.

FEEDING WHEAT TO PIGS.—If any one in the world understands the profit in feeding pigs better than another it is probably P. D. Armour, of Chicago, U.S.A. He owns the biggest "hog palace" on this earth, and kills more pigs during one week than are raised in Australasia during a year. Wheat was selling at 2s. 2d. per bushel in Chicago, so Armour put up eighteen pigs on September 15th, and fed nothing but wheat to them during the next fourteen days—1,650lbs. wheat altogether. Then he weighed the pigs, and found they had gained 525lbs. in weight. Pigs were then selling at 2½d. per pound, so this meant a cash profit of £59 upon the grain; or, in other words, the value of the wheat as converted into pork was now within a fraction of 4s. per bushel. This coincides with similar experiments conducted by J. L. Thompson, at Richmond Agricultural College, New South Wales a few years ago. The value of the manure left upon a farm from the rearing of pigs ought to be taken into account.

**CENTRAL AGRICULTURAL BUREAU.**

MONDAY, DECEMBER 13.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir S. Davenport, Messrs. M. Holtze, Thomas Hardy, J. Miller, M.P., T. Price, M.P., and A. Molineux (Secretary).

**Finance.**

The Finance Committee reported expenditure to date for contingencies £422 17s. 9d.; balance, £327 2s. 3d. Accounts to the amount of £81 10s. 4d. were passed for payment.

**Water for Irrigation.**

MR. HARDY said there was a mistake in the report of the latest meeting of the Bureau with regard to the cost of pumping water by means of an oil engine. In the case he mentioned the cost for oil was  $\frac{3}{4}$ d. per 1,000 gallons of water pumped, and another  $\frac{1}{4}$ d. per 1,000 was a liberal allowance for wear and tear, depreciation, &c., so that the total cost would not exceed 1d. per 1,000 gallons, raised 15ft. from bottom of well.

MR. MILLER asked whether water from the mains could not be more economically distributed by means of sprinklers on account of the pressure, than water pumped from a well.

MR. HARDY thought not, particularly with plants like lucern, which required an occasional flooding. For a smaller flow storage or pressure is necessary on account of waste from soakage.

**Grapes for Export.**

The Minister intimated, in reply to request of the Bureau that two barrels of Spanish grapes as packed for export should be sent out by the manager of the London Produce Dépôt as an object lesson to exporters here, that as the price for Spanish grapes would probably at this season be very high, and the cost considerable, it would perhaps be better to ask the manager of the dépôt to obtain and furnish full particulars of the method of packing adopted by Spanish exporters.

MR. HARDY said his reason for suggesting that the grapes should be obtained now was that in England grapes from Spain could be purchased at about 4d. per lb., and even up to February in a bad season he had purchased them retail at 6d., so that the cost would have been very little, while the object sought was of considerable value. What they wanted to know particularly was the quantity of cork dust to use. He believed the last shipments from here failed owing to using too little packing.

It was suggested that as some of the mail steamers brought out grapes for consumption by the passengers, it might be possible to obtain the consent of the agents to the examination of the barrels. It was decided to see whether this could be done.

**Sugar Beet.**

The CHAIRMAN reported receipt of letter from Mr. C. Fuhrmann, of Schoppenstedt, Germany, intimating his willingness to favorably consider the question of starting a sugar beet factory in South Australia. The Chairman stated that Mr. Fuhrmann, who had established some of the largest factories in existence in America, had instructed his agent to communicate with him on the matter.

**Defoliation of Citrus Trees.**

The CHAIRMAN referred to the loss of leaves from citrus fruits, and stated that he had two large lemon trees in his garden, one of which was very healthy and the other badly affected.

The INSPECTOR OF FRUIT said the defoliation was very general, the oranges being particularly affected. In the valley of the Torrens the trees worst affected were those best looked after, well manured, and irrigated. Trees not so forced had not suffered so much.

Mr. HARDY said his experience was similar. The trees which had received most water were affected most.

### Codlin Moth.

Mr. HOLTZE said it was agreed some months back that at this meeting he should elaborate a scheme regarding his proposal to attempt to stamp out the codlin moth by destroying all fruit in infected districts, and paying compensation. As there appeared some prospect of the method of trapping referred to at a previous meeting having a good result, he thought he had better let the matter drop for a time.

In reply to questions, the Inspector of Fruit said he had no doubt that codlin moths would be caught in the traps, but owing to press of work he had not been able to follow the matter up. Mr. Hardy said he had about twenty traps going, and although he caught thousands of moths and other insects, he had been unable to detect any codlin moths. He used pickle bottles as well as the fire grenades, and found the bottles more effective as the opening was larger.

### Caterpillar Plague.

Members generally reported severe damage by various caterpillars, particularly among young vines. Mr. Hardy stated that where the Paris green, bran, and treacle remedy had been tried early, the results were most satisfactory.

### Fruit Show at Brisbane.

The Minister forwarded communication from Queensland Department of Agriculture intimating that an intercolonial Fruit Show would be held at Brisbane about the end of January, 1898, and requesting the assistance of the Department in securing a good show of South Australian fruit.

### New Strawberries.

Mr. PRICE inquired what had been done with the new varieties of strawberries received from England.

The SECRETARY reported that the plants arrived in very bad order, nearly all being dead, and none were now alive.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

182. *Planting Pines on Drift-Sand*.—Mr. Chief-Forester Kottmeier, of Cottbus, in Prussia, in a paper on growing forest trees wherever portions of the land do not pay for grain or root growing, or for grass, made remarks which seem useful for some of our farmers who are in possession of shifting sands. He advised, first, to level such land to prevent the wind finding special places of attack. Next, the object must be to fix the sand somewhat by means of turf, if available, or some clay—in very bad cases, perhaps, by planting marrom grass or brushwood. Best of all, twigs of pines with their cones can be used, which, while preventing the sand being blown about, will spread the seeds, so that in most cases no raking will be required. If you have to sow the seeds broadcast, you will require 4lbs. per acre, or, if you use the cones, from 6bush. to 8bush. of them. To plant young pines you may use a planting stick, and it is best to plant them thick, so that the inevitable loss of many of them will not prevent the rest from closing. But in any case it is necessary for some years to have an eye upon such plantation.

183. *Microscopic Gardening*, by H. Marshall Ward, Professor of Botany at Cambridge, contains references to fungi of particular interest to all cultivators of the soil, as they require some of our living cultivated plants as a substratum for their growth; not any soil, decaying

vegetable or animal remains, or any gelatinous medium specially prepared by an operator. He refers, for instance, to hybridizing by hand, not through bees or other insects; that the selected pollen-grain is sown on the sugar solutions which moisten the stigmas of flowers. It absorbs water and oxygen, feeds on the sugar, and grows, just as a seed may be grown in water, until all the reserves are used up; it puts out its pollen-tube exactly as if planted on the sugar-laden stigma, and grows down the style into the ovary of the flower, where it reaches the ovules—the future seeds. But the stigma may also nourish the spores of fungi, as proved by Mr. Woronin, on the fruits of bilberries becoming one black mass of fungus. The spores were carried by insects on to the stigma of the bilberry, and there sown mixed with the pollen of the bilberry, which spores, however, like true weeds, grew so much more quickly and vigorously, that they soon occupied the whole area, and, growing down the style, reached the young ovules, destroyed them, and converted the whole fruit into a mummy filled with fungus. After dealing with the importance of using the best kinds of yeast, he says that it took centuries of work to establish the fact, that what the ordinary plant takes up by the roots in the absorbed water are only mineral matters left in the ash of the plant when it is burned, and constituting but a minute fraction of the food-materials of the plant—absolutely essential, however—to be worked up in the leaves with the far larger quantities of gases there taken in and assimilated in the chlorophyll apparatus by means of energy obtained from the sun. Ordinary green plants require but small quantities of mineral salts needed for the ash constituents, and forming only from 1 per cent. to 2 per cent., or a little more, of the whole dry weight, the rest coming entirely from the air. The mineral salts do not determine the value of a soil alone, as the structure, porosity, capacity for retaining heat and moisture and various gases, and a score of other physical properties are far more important factors. Soil is not merely a complex of bits of rock and chips, of rotten leaves and wood; it teems with microscopic living beings. A thimbleful of garden soil contains many millions of microscopic algae, fungi, bacteria, infusoria, and other living beings swimming in the films of water lining the interstices between the particles of sand, slate, granite, clay, wood, straw, dung, bones, insects' legs and scales, and other tiny bits of dead things. They consume oxygen, and give out carbonic acid and other excreta; and while living, growing, feeding, reproducing, and dying they induce changes in the soil, so continuous and so varied, that the changes must be vast indeed. The greater number is just beneath the surface, and they diminish rapidly till few or none occur at 3ft. or 6ft. down. A sandy soil may only have about 1,000 per thimbleful, where a garden soil may contain 10,000,000, and the soil of a street 60,000,000 or 70,000,000. They are more numerous in moist, warm climates. A series of these organisms, whose whole life-functions are devoted to getting rid of the bits of stick, dead leaves and roots, pieces of paper and rags, and other forms of the substances known to chemists as cellulose and allied bodies, convert them gradually into gases, such as carbonic acid and water, and so ridding the heavily-laden earth of a burden so great that a very simple calculation shows, if they accumulated unchecked, there would soon be no room for man on this planet. Ordinary plants cannot utilise these things; but the above organisms are active in every manure-heap, refuse-heap, and in cultivated land. One form has been separated and grown in microscopic gardens, which converts urea into certain salts of ammonia, and makes it thus valuable to plants; while still another form brings about the oxidation of ammonia salts to salts of nitrous or nitric acids, in which forms they are even more available to the roots of the higher plants. The nitrifying organisms, either alone or in symbiosis (living together) with pea-flowering or other plants, fix the free nitrogen of the air; and others again undo the work, and set the nitrogen free for the use of our cultivated plants. We know now disease germs, that of "finger and toe," which Dr. Somerville and Mr. Massel say can be combated successfully by lime. Plants affected with mildew must be treated with sulphur. As early as 1858 Kühn observed that certain smut fungi (Hunt) obtain access to the seedling owing to their spores adhering to the grain and germinating at the same time; but he found also that steeping in copper salts kills the spores without hurting the grain. DeBary has demonstrated two facts—the entrance of the germ-tube of the parasitic fungus into the host-plant, and the wonderful phenomenon of Heteroecism—that is, a parasite growing in the tissues of one host-plant, such as a grass, develops in one way; but, in the tissues of another plant, such as the barberry, it produces quite a different fungus. Eriksson and Henning have examined the behavior of rust on 105 species of grasses, and have found that just as we have varieties and races of the higher plants, so with *Puccinia graminis* (the fungus of wheat-rust) there are several distinct varieties, which behave very curiously. For instance, the variety which infects the barley will not infect oats or wheat, but will grow on rye and twitch; that on oats refuses to infect wheat, and conversely; that on *Aira caespitosa* is different again, and so is that on *Poa*. And yet all these form-species or varieties will grow on the barberry; and since they are practically indistinguishable under the microscope, we are driven to the conclusion that it is owing to some influence of the host-plant on the physiology of the

fungus that it has thus become specialised in its parasitism. Such specialisation applies also to Ustilago and others. When it became clear that the "smut" of corn, the fungus of wheat "rust," and the "mildews" of vine, hop, and potato only dwell for a few weeks in the tissue of the host, and that before they establish themselves in these tissues the spores have to pass through a period of germination, in which their delicate germ-tubes are so exceedingly sensitive to external agents, that the merest trace of acids or alkalies, or poisons of various kinds, kills them in a moment, it seemed obvious that all we had to do was to apply a selected "weed-killer" to the germinating spores. The discoveries made concerning the way a fungus attacks the solid cell-walls of the host-plant are remarkable. Solvents of various kinds have been shown to be excreted from the tips of the fungus-tubes, which dissolve the cell-walls, and enable the tubes to penetrate and pierce holes through what would otherwise be impassable barriers, and if a drop of such solvent be squeezed out, and a piece of solid cell-wall be steeped in it, the latter melts away under our eyes. The pollen-tubes pierce their way down the style of the flower similarly.

### The Necessity to Import American Vines as Cuttings.

The Chairman tabled the following paper:—

*Resistant Vines.*—Under this title Mr. A. P. Hayne, Ph B., and in charge of Viticulture at the University of California, has now prepared a pamphlet with a view of aiding those who wish their ravaged vineyards replanted, and to correct misconceptions of some fundamental principles. More or less all American species can withstand the attacks of the phylloxera, which will be found on the roots, as their bites cicatrise them, but these are not followed up by the rotteness of the roots from which the European vines, the varieties of *Vitis vinifera*, soon perish. All the proposed remedies to preserve the European vines are either too expensive, or do not more than check the rapidity of the spread of the insect. Submersion for three months is but seldom possible, and even then leads to the vines contracting other diseases. Planting in sandy soil means 85 per cent. of pure sand without ever so small an admixture of clay, heavy manuring, and crops of inferior quality. Bi-sulphide of carbon and sulfo-carbonate of potassium injected into the soil require to be repeated annually, and thus can only be used for exceptionally valuable vineyards, or where a few diseased vines have been destroyed, and these insecticides are applied in stronger doses which would destroy living vines. After the unfortunate appearance of the phylloxera in Europe some thirty-six years ago, it was found that wherever there was an American vine in a vineyard, it alone did not seem to be affected, and where some of these had been grafted with the European sorts they gave abundant and excellent crops. The first attempts, however, of planting and grafting on a large scale, were disappointing; but among all some were noted that flourished most exceptionally and yielded, after grafting, heavier crops than had ever been obtained from European vines on the same soil. This led to closer attention to the eighteen distinct species of American vines. Failures in plantations on resistant roots or producing smaller crops merely show that they are not adapted to the soil, just as would be the case if the wrong variety of *V. vinifera* were planted. Mr. Hayne declares, and probably not only from his Californian experience, as he has been instructed at Montpellier, in France, that resistant roots perfectly adapted to soil, climate, stock, &c., will produce heavier crops, sweeter and better matured grapes of larger size than the *V. vinifera* would produce on the same soil, where there is no phylloxera at all. As regards the quality of the wine the results are in favor of the grafted vine, and it should be noted that grafted vineyards are less apt to coulure, or the dropping of the young berries. The only drawback is the extra time and expense of grafting and cultivation, as the resistant vines require more care to get them started. The greatest difficulty after all is that each of the eighteen American species embraces many hundreds of varieties, and even the species are with many quite confusing. There are hundreds of varieties of *V. riparia*, &c., of which some are valuable and others are not, enough to ruin many vignerons who planted the wrong varieties, especially in France, where the first plantations were made. By these mistakes we may now profit as well as by the successes achieved by others. Local experience is necessary also, no doubt; but the dearly-bought experience of other countries should not be ignored. In the first place, we can dismiss sixteen of the species as requiring either special soils, or on account of their refusal to grow from cuttings, and thus we have to deal only with *Vitis riparia* and *Rupestris* and their varieties. But now comes the real difficulty: to select the variety. Mr. Hayne says, in order to select the best to be had, one may have to go perhaps to the other side of the world, as we shall have to do. To produce stocks from seeds he calls a mistake, it being seldom that a grape seedling is as good as the mother vine; but some will raise the question, whether we have not been able to raise one already, or may raise one that is worth propagating without running the risk of introducing the phylloxera with cuttings from recognised varieties. After once phylloxera has reached South

Australia these should be of course purchased. What is wanted is a very vigorous and large-wooded variety that will easily accommodate itself to new soils and conditions. This may be here, but are they sufficiently resistant? For European soils varieties of *V. riparia* is found the best all round, as from 2,500,000,000 vines grafted on resistant stocks 1,700,000,000 are of this species, and the rest mostly *V. rupestris*. From Mr. Hayne's statements it appears, however, that *V. rupestris* should be planted in South Australia, except in a few places, where *V. riparia* would find sufficient depth, moisture, coolness, and richness of soil. *Riparia* roots do not go down like those of *Rupestris*, and the latter can therefore stand drought, where the former would perish. For California, also, *V. rupestris* is generally recommended, which I believe has yet more summer rains than we have. A cause of failure is only too often that the soil was not properly prepared for planting. American vines require a good ploughing twice as deep as for our European vines, and the drier and poorer the soil the greater care should be taken to prepare it. With ordinary ploughing the National School of Agriculture of France could achieve no success; but, after the same land had a very deep ploughing, cuttings from the same variety of *V. riparia* taken from the former plantation did as well as any vineyard in France. Hybridisation between American species has been carried on with a view of obtaining a grape that will resist, and yet have a quality, which will make grafting unnecessary. The foxy taste makes the wine, however, rather unpalatable, and hitherto even Lenoir (or Jacquez) has not reached the standard as regards quantity or quality. Again, the hybrids of European with American vines do not possess the same degree of resistance as the American parent possessed, and even of the foxy flavor they are not quite free, though when properly adapted to the soil they are very vigorous and thick-wooded, so that many prefer them to poor varieties of *Riparia* or *Rupestris*. But the perfect direct producer is not yet found, and grafting on the select varieties of the pure American species is still the best way to renew a vineyard. The chief difficulty with these is only that all American vines dislike strongly calcareous soils, though some will do better than others. In the cognac region of France, in some of the most famous vineyards, it has been found almost impossible to make either the *Riparia* or *Rupestris* grow, and they will have to try perhaps *Vitis Berlandieri*, by means of layers, for this species will not grow from cuttings. For the value of a vine is not merely its resistance: it must be thick-wooded, and adapted to the soil and climate, that will enable it to support the graft with a sufficient amount of sap. The nodosities on the very young, tender rootlets, resulting from the sting of the phylloxera, are found on most American vines, and still they may be valuable resistants. They are whitish or pinkish, and resemble somewhat the head and neck of a long-billed bird, and the insect (or several of them) is, as a rule, to be found in the acute angle formed where the head joins the neck, or, in other words, on the throat. If, however, cancerous patches of decomposition are found on the more fully-developed roots, something more serious is threatened, namely a tuberosity. This indicates less resistance, and it is customary to judge of the resistance of a vine by the nature, number, and position of the tuberosities. When these are found only to produce a wound, with a scab-like covering of cork, which may, when dry, be sealed off with the finger nail, there is very high resisting power. But as the cancers become deeper seated, and appear more numerous on the older roots, the more does the resisting power of the vine fall. A scale to indicate the resistance has been adopted, the maximum being taken as 20, and the minimum as 0. Thus the resisting power of the best *Riparia* and *Rupestris* varieties is given as 19-50, and that of the hybrid Lenoir as 12. The injury the insect does to the vine is not the loss of sap, for that is infinitesimal, but the decay of the roots. Old vines may not be destroyed for years, but the smaller root-system of a young vine cannot long support the life of it. It is folly to plant non-resistant vines in place of others that have already been destroyed by the insect, for they will have to be uprooted again in the course of three or four years. On the contrary, it is necessary to take into consideration all the requirements and adaptations of the different kinds of American vines, to obtain the best possible results instead of merely a fair one. As regards silicious clays, or loams, their compactness, humidity, and fertility is to be considered. If the soil does contain less than 8 per cent. of clay, it is classed as "light soil," and although European vines develop normally in them, only some Americans, and amongst them *Rupestris* and Lenoir, grow well, while *Riparia* and others make but feeble growth. An excess of silicious sand, however, becomes hard and compact after dry weather, so that even an excess of clay seems less harmful. A friable, light, warm soil is necessary for *Riparia* and *Rupestris*, as they have mostly sparse root-systems, much ramified, being terminated by an abundant growth of very tenacious root-hairs. Hybrids of American species (Americo-American) and with European (Franco-American) will develop vigorously in compact soils, as they have a more powerful root-system. In our dry soils the root-system must be very well developed, which it will not be in excessively moist soils. As regards fertility, *Rupestris* thrives better than others in poor soils, if tending to dryness; *Riparia* is more exacting, it throws

its roots out horizontally, instead of downwards, as in the case of *Rupestris*. No matter what the fertility of the soil may be, unless you plough the land deep before planting, say twice as deep as is usual, American vines will not grow well. If this is done, you may advance crop-bearing from one to two years, according to Professor Viala. The sooner vinegrowers in South Australia make up their minds that it is but a question of time before the phylloxera will make its appearance here, and act accordingly, the better it will be for them. Quarantine regulations can only delay the advent. Infection by the winged form is stated to be less likely than by the gall, or root-form, or the egg of one or both. Hence too great care cannot be taken in avoiding the introduction of cuttings which are not disinfected, as well as boxes, packing material, &c. Cuttings can be readily thoroughly disinfected, but not rooted vines, without destroying the greater part of them. Mr. Hayne says that *V. rupestris* St. Georges has been selected at the Experimental Station as the most suitable for California, and as our climate is somewhat similar, from the absence of summer rains, it is probably also to be recommended for South Australia, or at least one of the *Rupestris* group, whose native habitat is in soils much more arid and poor than where *Riparia* is growing wild on moist shady banks of streams, or in the depth of forests. The characteristics of *Rupestris* are a vigorous bushy vine with short, thick, strong trunk; one-year-old wood, dark reddish-brown or shiny chestnut; leaves, when young, transparent russet-red, when old, glabrous, thick, and green; small, wider than long, not lobed, obtusely serrated, and folded together to form a gutter; bunch small, with small spherical, violet-black berries, the interior of which is highly colored, is not so easily grafted when old as *Riparia*, roots long, slender, and very hard, sometimes large and fleshy, as in "*Rupestris du lat.*" Over 150 varieties are known, but, as a rule, it may be said that the valuable forms show very great vigor, strong trunk and canes, with thick, shiny leaves. All varieties with pale-green or yellowish thin leaves should be rejected. Professor P. Vialla names the following as valuable, and with the following resisting power:—*Rupestris* Mission, Ganzin, Martin (violet leaved), Ecole, Kansas, Fort Worth, Y. No. 64, all 18 points of resistance; No. 65 of 17 points, and Celeburne, Metallica, No. 62, and du Lat of 16 points of resistance. Of these he recommends as the most valuable for all-round adaptability, R. St. Georges (its resisting power is not given), Martin, Mission, and Ganzin. R. St. Georges replaces actually the Lenoir and Solonis in poor calcareous soils, throws out fewer suckers, and is more vigorous and thicker-wooded than any other thus far found. Synonyms are Phenomène, Phenomène du Lot, Sijas, Monticloa, St. Georges enge, &c.

*Vitis Riparia*.—The characteristics are not given by Mr. Hayne, but they spread much, have long joints, with leaves at first folded along the midrib, but afterwards opening out flat, usually heart-shaped or three-lobed, with sharp teeth, upper surface smooth, often very glossy, underneath duller green, smooth, or with a few hairs on the veins; bunch and berry small. They grow easy from cuttings, graft very well, and although not so vigorous as *Vitis cordifolia* and *rotundifolia*, these latter refuse to grow from cuttings. *Riparia* insist, however, on moisture and a certain amount of richness and fertility of the soil, and it is the former which will make it less valuable on most localities for South Australia. All the small-leaved tomentose varieties should be rejected, and Mr. Hayne speaks as well of *Riparia* Gloire de Montpellier as they do at the Cape of Good Hope, also of R. Grande Glabre and R. Martin; all of which show 18 points of resistance and 20 points of vigor out of 20 as highest number. All other species and hybrids are deemed to be more or less undesirable, even Lenoir, Herbemont, Clinton, and Vialla. The hybrid Solonis is valuable only in cold compact soils, too moist for any other American vine except the Lenoir, and it will even thrive in salty or alkaline land, but grafts badly. *V. californica* is but little more resistant than *V. vinifera*; and *V. arizonica*, though possessing a good resisting power (16), grows readily from cuttings, and grafts well, seems yet to be inferior to *Rupestris* and *Riparia*. If these latter cannot be obtained, adapted as they are to different soils, you are compelled to look amongst the available species, or Americo-American, or Franco-American hybrids: first, for proved resistance to phylloxera; and for vigor, thickness of cane, and, in our climate, whether they will thrive in occasional droughts. But it is, at all events, a risky matter; years and much money may be lost. The seedlings raised here are of course nondescript; they may show good strong canes, grow from cuttings and graft well, yet their resistance may not be better than *V. californica*, and, of course, there are no means of trying them in that respect. This, after all, is the chief aim in planting American vines—to be prepared whenever the phylloxera appears in South Australia. Notwithstanding the assurance of Mr. Hayne, that it is safe to obtain disinfected cuttings, I have my grave doubts about giving to private persons a permission to introduce them unless a nursery be established on the southern end of Kangaroo Island, or any other island under Government control. Cuttings not rooted vines could be removed from there after some years; and, again, those should be disinfected, to be doubly sure. This nursery might have to be kept for perhaps eight years, until a sufficient

number had been distributed, from which henceforth the necessary cuttings would be obtained for larger plantations. To me it appears necessary to introduce cuttings of one of the above *Rupestris* varieties, and, if possible, the *Rupestris* St. Georges. If one of the *Riparia* varieties should also be tried to a limited extent, R. Gloire de Montpellier is easily obtained in France.

Some of the remarks made by Mr. Hayne on grafting are interesting. Callus is rapidly formed by varieties like V. Berlandieri, *Rupestris* St. Georges, Cabernet Sauvignon, and others, and the more so in a temperature of 68° F.; but it must not exceed from 87° to 95°, nor below 60° F. If a cutting or a grafted cane be plunged into water so as to cover the lower parts of it, no cicatricious tissue whatever will form. In fact, grafts covered with fine sand, kept constantly wet by irrigation, instead of merely slightly moist, may put out young shoots; but will never form a joint. (Grafts deeply buried in very compact soils, which will prevent a supply of oxygen, will form scarcely any callus. In general, unless the stock and the graft are of the same variety, an enfeeblement of the graft, accompanied by an excessive fructification, is the result. The bunches and berries are larger, earlier ripe, and contain more sugar. The greater the difference in variety the greater will be the difference in effects. Grafts on the Muscadina, Ampelopsis, and Cissus will soon perish: even grafts of European vines on *Riparia* show a great difference in vigor, less in other resistant stocks, and still less in Franco-American hybrids. Various European varieties do not always behave alike on the same stock. Carignan does fairly well on *Riparia*; Grenache has but a medium affinity to resistant stocks. Mourastel suffers but little; Muscats, Muscadelle, and Sauvignon do well on resistant stock; Cabernet Sauvignon maintains its original vigor; Pinots and Malbec are more sensitive to the chlorose on dry and calcareous soils. Raffia-tying is preferable to any other ligature for whip-grafts, elastic bands being too expensive. For cleft-grafts no tying is required, as the stock is generally thick enough to hold the graft in place; and daubing them with clay prevents respiration, as would also the bands of raffia if they were made to touch each other at whip-grafts. There is no danger from the sap beginning to flow at the time of grafting; the scion is not drowned. Care should be taken in covering up the graft; too deep is as bad as insufficient covering. The cutting of any roots made by the graft should not be neglected, as you endanger otherwise the root development of the resistant stock. To obtain plenty of strong wood for next year's propagation from a few cuttings, you should cut them into short scions, and graft them on some vigorous resistant or non-resistant vines, taking care to pinch off all weak or secondary growth. The most important thing is the preparation of the cutting-stock. All the buds or eyes, even the one at the very base, should be carefully cut away with the knife, so that they cannot grow out again. This precaution is more particularly necessary in the case of the *Rupestris*, and thus prepared they take better than almost any other. Prof. Vialla states that 80 per cent. of no less than 45,000 grafted *Rupestris* cuttings grew well; and even of a number of grafted cuttings of *Rupestris* imported last year from France, 70 per cent. grew at San José, in California. The scion should have one or two buds. Grafted cuttings are made in France in April or before, frequently later; and if we are to order a few, together with a large number of mere cuttings, not much time should be lost. How they can be best shipped to a distant place must be left to some person who forwarded previously lots to California, or rather to the Southern Hemisphere—the Cape. In small bundles they should be buried, not too deeply, in cool sand, and kept just moist enough to prevent their drying up. In France the grafted cuttings are apparently first buried in sand, and not planted in the nursery, before the joint is almost complete, the scion commences to develop, and the roots to grow. I presume the cuttings may thus be kept until our time for planting. The best nursery is a moist, sandy, or gravelly alluvial, rich in humus and all the plant-food required for vines—if fertilisers are used they should be applied some time before—not apt to bake or crust, nor getting too dry. Grafted cuttings must have the joint an inch below the natural level of the soil, and they should be put in on a sloping bank, not less than 4 in. apart in the row, and if cuttings are planted for grafting in the nursery, of course far greater distances will be desirable.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Forster—Messrs. J. Johns, C. Bolt, and W. Bennett. Port Lincoln—Mr. W. Hutcherson.

### Reports by Branches.

The SECRETARY reported receipt since previous meeting of twenty-eight reports of Branch meetings.



## REPORTS OF BRANCHES.

**Naracoorte, November 13.**

Present—Messrs. O. Hunt (Chairman), S. Schinckel, J. Wynes, A. Limbert, D. McInnes, and R. U. Paris (Hon. Sec.).

**SUMMER FODDER.**—Members reported failure with cow peas; some grew but had died off again. It was also stated that the sorghum plots were not doing well, and this was attributed by Mr. Wynes to the cold weather.

**MANURES.**—A conversational discussion on this subject took place.

**STOCK COMPLAINTS.**—Mr. Limbert reported one of his horses suffering from greasy heels, but members could not suggest a remedy. [It has been stated that a very simple and effective treatment is to rub on the affected part a little paste made by mixing gunpowder and vinegar together. The Chief Inspector of Stock recommends the following treatment:—Give cooling medicine; wash heels with soft soap, rub dry, and apply carbolic oil daily; give 1oz. nitrate of potash in bran mash occasionally, keep the animal clean, and give him a rest. —GEN. SEC.] Mr. Schinckel stated that a cow of his milked in the morning had gone dry by evening, and had not given any milk since. The Chairman thought a spoonful of carbonate of soda in half a pint of water would be beneficial.

**Belair, November 5.**

Present—Messrs. Alex. Murray (Chairman), W. H. Sanders, F. D. Peterswald, W. J. Bartlett, O. Nootnagel, A. Halstead, G. R. Laffer (Hon. Sec.).

**FRUIT PESTS.**—Members were of opinion that the appointment of a competent economic entomologist would be of immense value to the producing community. Mr. Halstead reported having sprayed trees affected by peach aphid with kerosene emulsion with good results. Mr. Nootnagel tabled specimens of new codlin moth traps, which members considered very simple.

**STRAWBERRIES.**—Mr. Bartlett read the following paper on "The Cultivation of the Strawberry":—

*Selecting Land.*—In selecting land for growing strawberries I prefer a hill-slope facing north, north-west, or west. Such slopes are most suitable for the production of early fruit; and while, of course, other situations grow good crops, they are as a rule rather late. I believe in planting some strawberries in late ground in order to avoid having more ripening at one time than can be picked, and also to keep up a regular supply for my customers throughout the season. Strawberries flourish in a great variety of soils, but the most suitable is a strong loam with cool subsoil. Do not plant on dry sandy soil or on gravelly land unless it has a fair quantity of clay mixed with it. On slaty land they do remarkably well, and stand the heat and dry weather as well as on any class of soil. On sandy land they may make rapid growth, but it is difficult to keep them alive through the summer. Taking all things into consideration, planting on strong, loamy soil with cool clay subsoil or on slaty land will give best results.

*Preparation of Land.*—The land should be well broken up to a depth of from 12in. to 15in. with grubbers, taking care not to bring too much clay to the surface, as it bakes very hard in the summer, and does not retain the moisture as it would do if left below the surface. The land should be left in as big clods as possible throughout the summer to allow the air to penetrate and sweeten the soil. Towards the end of summer the clods should be well broken up, and the land then dug with a fork so as to leave no clods unbroken beneath the surface; then harrow down, and it will be in a first-class condition for planting.

*Varieties.*—In choosing the varieties to plant I consider the Margaret the most profitable to grow, being the most prolific by far, of good color, and fairly firm. They pay me better at 4d. per pound than Sir Joseph Paxtons at 6d. The latter are not, in my opinion, naturally shy bearers; but being late, usually suffer from lack of moisture. They are very firm, of high quality, good color, aromatic, and carry well to any part of the colony. The Edith is a very fair bearer, but also very soft. Being one of the first to mature, I would, however, always plant a few.

*Planting.*—In planting strawberries on a large scale I would plant at not less than 27in. apart between the rows to allow plenty of room to use the cultivator. The plants should be one foot apart in the rows. Planting with a double line saves a lot of trouble—one line up and the other down, and there is less treading on the soil, which is also a matter of some importance, especially when it is wet. Some growers make a practice of cutting off part of the roots when planting; but I am altogether against it, as, having planted both ways, I am quite sure they do better planted with the root intact. I would plant one row of Edith to every nine of Margarets, as by doing so the latter set better and come in earlier.

*Cultivation after Planting.*—Attention to the plants after setting them out is one of the chief points in successful strawberry-growing. Some people appear to think they have only to plant and then wait for the fruit; but unless they cultivate well and keep them free from weeds they will need to wait a long time for their crop. Now, there is great difference of opinion as to whether shallow or deep cultivation is best. During the past three or four years I have confined myself almost entirely to strawberry-growing, and have carefully tried both methods. With plants up to two years old shallow cultivation gives best results. I plant in May and June, and give at least two light hoeings before October, even if there are no weeds, as it induces quicker growth, and the plants get better established before the hot weather sets in. With the plants growing well there is also a fair chance of getting a small quantity of very fine fruit off the young plants. I may say that from my strawberry plot I picked about 1,800lbs. of the finest fruit I ever saw off bushes only five months old, and this I put down mainly to shallow cultivation. When the bushes get older, however, deep cultivation is necessary, as the plants seem to have more vigor and produce finer fruit. Deep cultivation should never be carried on after May, as the plants start to make their root growth for fruit after the first rains, and if these are interfered with it will make the crop later and injure the chances of a good crop.

*REPLANTING.*—Many people contend that strawberry beds cannot be profitably replanted, and I must admit that they do not do so well on land that has previously carried strawberries. It seems as if they soon exhaust some necessary constituent which might be replaced by means of commercial fertilisers if we only knew what it was. Information on this point would be of great value to strawberry-growers. [Strawberries are a very exhausting crop, and take from the soil large quantities of phosphoric acid, nitrogen, and potash. The general practice in America, where they are grown on a large scale, is to get two or three crops off the plants; then plough them under and grow other crops for several years, making strawberry beds in new ground each season. The practice of replanting old beds is not referred to at all in any of the publications in the Bureau Library. One authority recommends manuring poor soil before planting with 3cwt. to 5cwt. superphosphate, 2cwt. to 3cwt. nitrate of soda, and 1½cwt. to 2cwt. muriate of potash per acre, or giving a very liberal dressing of well-rotted stable manure. Possibly similar treatment would do in replanting old beds.—GEN. SEC.]

### Clarendon, November 18.

*Present*—Messrs. James Wright (Chairman), J. Spencer, A. Harper, J. Chapman, W. A. Morphett, W. Spencer, J. Piggott, A. A. Harper, J. Juers, and A. L. Morphett (Hon. Sec.).

*DAIRYING.*—Members were very pleased with the Jersey bull loaned by the Government to the Branch, and thought he would prove of great value to the district. Several members reported disease amongst dairy cattle, causing stiffness in the limbs and difficulty in rising. Mr. Harper stated that one of his cows had succumbed to the disease.

*FRUIT-GROWING.*—Mr W. A. Morphett read a short paper on this subject. He recommended that all pruning should be finished by the middle of August, and the prunings burnt. The trees should be kept low, and the old trees cut back, as low trees mean economy in spraying, pruning, and picking. Only good varieties should be planted, and in old orchards poor varieties should be cut down and reworked or grubbed up. Limewashing the stems and an occasional spraying of the limbs with the same material will prove beneficial in keeping down insects, lichen, &c. The old bark should be scraped off, as it

only affords a harbor for insects. The land should be properly cultivated and kept free of weeds. Great care should be exercised in picking, and soft fruits in particular very carefully handled. It will pay with all fruits to line the boxes with paper. It pays best in the long run to put only one quality in one box, and keep all damaged fruit for the pigs.

### Forster, November 4th.

#### INAUGURAL MEETING.

Present—Messrs. W. Johns, F. Towill, A. Johns, J. Sears, J. E. Bolt, S. H. Plummer, and S. Sears; J. G. Whitfield, W. G. F. Plummer, and H. Plummer, of Bowhill Branch, and four visitors.

BUSINESS.—Mr. J. G. Whitfield was voted to the chair and gave an address on the working of the Bureau, and was followed by Mr. W. G. F. Plummer on the same subject. Messrs. A. Johns, F. Towill, and S. H. Plummer were elected Chairman, Vice chairman, and Hon. Sec. respectively. It was decided to meet monthly, and that each member in turn be responsible for the business of the meetings.

CONSERVATION OF FODDER.—Mr. H. Plummer read extract from paper read by Mr. F. Wheaton at Redhill on this subject. Mr. A. Johns recommended planting sheaonks as a breakwind. They would break the strong prevailing winds, provide shelter for stock, and give a large supply of food in seasons of drought. If the fruits are picked before they are quite mature and allowed to dry the seeds drop out. Sow the seeds in nursery beds and plant out in March and April. Mr. J. Sears advocated gathering as much straw as necessary and leaving the rest on the field instead of burning it.

### Port Lincoln, November 19.

Present—Messrs. S. Valentine (Chairman), J. D. Bruce, R. Puckridge, J. Telfer, W. Laidlaw, E. Chapman, W. P. Goode, K. S. Browne, W. Hutcherson, and J. Anderson (Hon. Sec.).

BRANCH SHOW.—Lipson Branch agreed to co-operate in holding the annual Branch show of produce at Port Lincoln in March next.

SHEEP-FARMING ON COASTY COUNTRY.—Considerable discussion, in which all the members took part, ensued on Mr. Browne's paper. Mr. Laidlaw said for coast disease, especially with cattle and horses, he had used sulphate of iron with good results, but with cows in milk great care was required, as it prevented the cream from rising. He had kept a bull healthy on coast country during past five years by giving him a few drinks of water highly colored with sulphate of iron on first signs of disease appearing. As the animal got older he became less subject to the complaint. With sheep he puts the aged animals on coast country at the time of the year when they are most liable to the disease, and in this way manages with two changes during the year. He thought dipping had not been fully successful in destroying tick, but it certainly improved the wool. He did not believe in skirting the wool, more than taking off any dirty pieces. All members agreed that iron was the only known remedy for coast disease; the best plan being to shift the stock on to ironstone country when possible, and, failing this, to give sulphate of iron in the drinking water, taking care that the water is constantly stirred, as the iron precipitates very quickly. Coast disease is not so bad as it used to be; and it was suggested this might possibly be due to the constant travelling of sheep from ironstone to coast country carrying a certain amount of iron on to the

latter. Mr. Valentine said he knew of coastly animals recovering when yarded in a place where stock from a particular station on ironstone country were yarded the first night of travel. It was suggested that as there was plenty of almost pure ironstone gravel in many places near to coastly country it might be worth while carting a quantity of it and spreading it in patches here and there. All the members were in favor of dipping for tick, and many thought it would be more effective if done some time after shearing when there is a little wool to carry the dip.

### Pine Forest, November 9.

Present—Messrs. J. Phillis (Chairman), D. F. Kennedy, W. H. Jettner, J. Flowers, and R. Barr, jun. (Hon. Sec.).

**STRAW-BALING PRESSES.**—Mr. Kennedy called attention to article in the September issue of the *Journal of Agriculture and Industry* in reference to utilisation of straw. He thought the subject well worthy of the serious consideration of stockowners in view of the frequent occurrence of seasons of scarcity. Other members agreed, and it was resolved that—"This Branch requests the Minister of Agriculture to obtain a continuous baling press for use at the Roseworthy Agricultural College, and that some buildings of baled straw be erected there to demonstrate the benefits of this system of conserving the straw."

**HARVEST.**—Members were of opinion that within a radius of eight miles of Bews the crops will average from 3bush. to 4bush. per acre.

**RAINFALL.**—A table showing the rainfall at Bews during each month of the past three years was tabled. The totals were:—1895, 12·380in.; 1896, 14·850in.; 1897, to end of October, 10·380in. During the first four months of 1897 the total fall was only 1in.

### Renmark, November 12.

Present—Messrs. W. H. Harrison (in chair), H. A. Rossell, F. J. Burrill, E. Taylor, S. R. Cox, and W. H. Waters (Hon. Sec.).

**CURING LEMONS.**—Mr. Cox showed lemons cured in red gum sawdust, which members considered compared very well with lemons cured in teatree bark.

**APRICOT TREES DYING.**—Mr. W. H. Harrison, M.A., read the following paper:—

We are all quite aware that in our apricot plantations young trees in various stages of growth sometimes suddenly, and sometimes gradually, show signs of premature decay. It would be absurd, in the absence of careful quantitative analysis of the soils in the immediate vicinity and comparison with the result of analysis of soil somewhat similar in appearance, but where the trees are uniformly healthy and vigorous, to speak dogmatically as to the exact cause or causes of this undesirable state of things; still it is a matter which so seriously affects many of the Renmark settlers that, although considerably puzzled in my endeavors to trace a sufficient connection between cause and effect, I readily assented, at the request of our Secretary, to introduce the subject for discussion, in the hope that some practical remedial measures might be suggested from a comparison of our several experiences.

It seems to me quite clear that the evil under consideration does not result from exhaustion of the soil, but chiefly if not entirely from the presence of soluble mineral substances in excess, principally alkali, in the form of chlorides and carbonates. While these salts in minute quantities constitute valuable elements of plant food, any one of them greatly in excess of the requirements of any particular plant will prove fatal to the plant. Without careful quantitative analysis of both the surface and the subsoil we are altogether in the dark as to the suitability of any particular spot of our greatly varying soil for any particular variety or kind of fruit tree, or to what extent it is practical to modify the nature of any given spot so as to fit it for the growth of trees which at

present have a tendency to die out prematurely. While urging most strongly the desirability of analysis of our several varieties of soil, my long experience as a teacher of agricultural chemistry places me entirely in accord with the statements of Professor Lowrie, as quoted in the November issue of the *Journal of Agriculture*, in reply to inquiries made by the Inkerman Branch, to the effect that analysis showing merely the elementary constituents of a soil is not alone a sufficient basis on which to form an opinion as to the suitability of any particular soil for any particular plant. The remarks of the General Secretary on this subject, however, while perhaps affording the best practical advice to farmers whose main object is to increase the productiveness of their land, scarcely apply to our case. If we can learn the percentage of alkali, organic matter, and soluble phosphates we shall be in a much better position to try experiments on a small scale. I think inquiries should be made at the School of Mines as to whether we can obtain information on the one or two points suggested as above without having to pay for the complete analysis of the sample sent. [Branches of the Bureau can have soils analysed at the School of Mines at a charge of 3s. for each determination required; that is, if the percentage of, say, three of the constituents of the soil is required the charge will be 9s.—GEN. SEC.] It seems to me that such information ought to be obtained gratuitously from the School of Mines through the Central Bureau. When I had the control of a laboratory I was always most willing to make such examinations, finding such work most suitable employment for the students.

I have carefully examined the dead and unhealthy trees on Mr. Swiney's plantation as far as my very limited appliances would admit. The soil is a fair specimen of average sandy loam, occasionally verging on clay loam. I found the somewhat abundant presence of alkaline carbonates in all parts of the plantation, but particularly on the portion where there were most dead and unhealthy trees. Although there does not appear to be a deficiency of phosphoric acid, it is possible that a liberal application of phosphatic manure might make a more even balance and somewhat counterbalance the effects of a probable excess of alkali. Frequent light dressings of gypsum ought to be beneficial, especially on the hard patches; and good results might be obtained from sitting the bark continuously from the base to the union of the main branches; also from whitewashing the trunks of trees slightly affected. Whatever other mode of treatment may be adopted, it follows as a matter of course that the whole of the often superabundant crop of fruit should be removed at once on a young tree showing signs of suffering.

**INSECT POWDER PLANT.**—A member reported having a considerable quantity of flowers of the Pyrethrum, or insect powder plant, and wished to know what treatment was necessary to convert it into insect powder. [Pick the flower heads, dry them till brittle, and grind to powder.—GEN. SEC.]

### Forest Range, December 2.

Present—Messrs. J. Vicars (Chairman), G. Monks, A. Green, H. Cherryman, R. Townsend, J. G. Rogers, J. B. Fry, C. Stafford, R. M. Hackett (Hon. Sec.), and one visitor.

**SEED POTATOES.**—Members generally obtain change of seed each year from the plains, except when two crops are grown, in which case the seed potatoes are kept for the next crop. Mr. Monks said he had kept potatoes from November till October by spreading them out in an airy loft; they keep best when they have turned green. Some growers keep them in bags, turning them occasionally.

**RASPBERRY CROP.**—Members reported light crop of raspberries and smallness of fruit through dry weather. The crops were also greatly injured by severe frost on night of November 27.

**SEED EXPERIMENTS.**—Mr. Green tabled sample of Burpee's Quality pea, grown from Bureau seed. He believed it would prove a valuable variety for dry seasons; it was a good cropper, with fair-sized pods, matures within twelve weeks from sowing, and grows about 3ft. high.

**CODLIN MOTH.**—Mr. R. M. Hackett read the following paper:—

In considering the advisableness of this Branch requesting the Central Bureau to use its influence to obtain the appointment of an economic entomologist, we have first to ask ourselves, as growers: Is it necessary? At the Conference of Hills Branches reference

was made to the fact that the codlin moth pest was decreasing in our district, also in certain portions of Coromandel Valley. This fact, it seems to me, must be due to one of three causes—First, to unsuitability of climate; second, to extra care taken by growers to exterminate the pest; or thirdly, to the action of natural enemies. Referring to the first cause, unsuitability of climate, I find it is stated in *Californian Fruits* "That in the cooler parts of the State there is apparently considerable delay in transformation, and deposit of eggs at random on skin of fruit." I think growers will agree that in this point our experience as a district agrees with the Californian authority, and that climatic conditions here are probably keeping the moth in check. Secondly, as to extra care of growers here in fighting the moth, it has not taken place; we have not set ourselves to keep it out, and cannot claim any credit for its decrease. Thirdly, to the action of its natural enemies, I firmly believe that it is owing to the action of some kinds of cannibal or parasitical insects that the moth does not spread amongst us, and possibly to other insect friends of whom we know too little about. Now, will an entomologist be able to help us? I think, if one were appointed, his time would be necessarily fully employed at headquarters in classifying, &c.—doubtless a great thing in the interests of science, but of very little good to us as growers. Through the Central Bureau we at present have nearly all the advantages of having a Government entomologist, for we do not want specific knowledge of insect life so much as a general knowledge of whether the insects about us are hurtful or the reverse, that knowledge the Central Bureau is always willing to give us. But what I think we do want is for the growers to forward insects for identification, and to have same returned to them after being named, so that the Branch could have an object lesson before them. The cost of a case or two—one for injurious and the other for helpful insects—would be trifling, and the consent of the Minister of Education to keeping some at the local school could doubtless be obtained. Another reason advanced besides the codlin moth and its enemies for having a Government entomologist appointed is the fear of the introduction of the fruit fly; but in what way he would be servicable in preventing its introduction I cannot see. The present regulations are stringent enough; if it is found here, the department having power under the Act to destroy, with or without compensation, trees in any gardens found affected, if the owners persistently neglect to obey the regulations under the Act. It seems to me that a better course than pressing for the appointment of an entomologist, involving as it would considerable cost, would be to refer the matter for discussion to the Conference of Branches, to be held next February, subject, of course, to any action the Government might take in the meantime.

Mr. Vicars considered an entomologist to travel round the gardens investigating the natural enemies of the codlin moth and other pests, as the late Fraser S. Crawford used to, would be of immense benefit to the growers. Most of the members agreed, and also considered that the codlin moth was being kept in check in this district by some enemies. One member thought it would be a mistake to make spraying with Paris green compulsory, as they would probably destroy their friends as well as foes. [The enemies of the codlin moth, if any, would not eat the fruit, and consequently could not be injured by the Paris green or other arsenates. If a spray such as kerosine emulsion or resin wash were used, then both friends and enemies might be injured where both exist in the open air. The caterpillar of the codlin moth, being inside the fruit, would not be injured by any kind of sprayed compound.—GEN. SEC.] The following resolution was carried:—"That this Branch favors the appointment of an entomologist, but is of opinion that the subject should be discussed at the next Conference of Branches in February."

### Dawson, November 13.

Present—Messrs. R. Renton (Chairman), S. Chapman, C. F. W. Just, J. Kenseley, A. G. Kennedy, F. Schebilla, Thomas Weatherall, A. H. Warner, A. F. Dempsey (Hon. Sec.), and two visitors.

RAINFALL.—Reports showing the rainfall during past ten months were tabled. At Cavenagh West the record for each month is as follows:—January, 0.200in.; February, 0.650in.; March, nil; April, 0.150in.; May, 0.355in.; June, 0.930in.; July, 1.420in.; August, 0.635in.; September,

0.230in.; October, 0.295in., or a total of 4.865in. At Cavenagh East the total record is about an inch more, while in other parts of the district it is even less.

**BINDER TWINE IN CHAFF.**—Mr. Wetherall referred to loss of horse through felt balls forming in the stomach, and stated that the owner attributed these to the fact that the animal had been fed on chaff which was found to contain a quantity of cut binder twine. Several members stated they had lost stock from the same cause. Deaths from these balls was a common occurrence in the North in dry seasons, and was attributed to the fibrous nature of the bushes and other feed. They did not consider that the binder twine had anything to do with it, though the practice of some merchants in cutting it up with the chaff was strongly condemned, as the twine was certain to have an injurious effect on animals swallowing it. It was finally resolved—"That this Branch, recognising the ill effects that are likely to accrue to stock fed on chaff mixed with binder twine, suggests that the subject should be laid before the Branches of the Bureau, in order to ascertain the best means of preventing a continuation of this growing custom."

**DISEASES OF HORSES.**—Mr. Wetherall read the following paper on "Some Diseases of Horses":—

In addressing an unprofessional audience on the subject of diseases in horses, I am deeply conscious of being myself a non-professional; I shall therefore only endeavor to deal with diseases in a general way. If, however, I can be of any service, and can excite a general interest in the treatment, wants, and ailments of those most useful animals, it may be followed with practical results.

I think the farmer should endeavor to make the horse, cow, and sheep a special study, for they are objects of social wealth and of vital importance to mankind. The difficulty will not be to find something to say about the diseases of horses, but to say the most useful thing in our limited time. I shall not be expected to enter into a minute description of the diseases known in the district, but may give a few hints stating some of the broad principles and facts that may be useful to some. I have made human diseases almost a life-long study, and we know that animals of the higher class suffer from much the same diseases as man, and these generally arise from the same causes, as, for example, fevers, lung disease, diseases of the liver, kidneys, nervous and muscular systems. Circulation of blood is very similar, and the functions of the most important organs of the body are the same, and require the same treatment.

In the disease, as in the treatment, there is but little distinction between the domesticated animals and ourselves. I am aware that differences do exist, but they do not affect the general question that the organs of life are the same, and require somewhat similar treatment as in the human being. Now, I think that the diseases of the organs of respiration may first be considered, for none are of more importance, and none are more liable to sudden and serious disease. The breathing organs are the lungs and bronchi; those we might call the assistants are the nasal passages, the larynx, and what is commonly known as the windpipe. It is important to bear in mind that most of the diseases connected with the organs of respiration are of an inflammatory nature, *e.g.*, catarrh, inflammation of the larynx, sore throat, bronchitis, pleuritis, pneumonia, and pleuro-pneumonia. Many other diseases of the respiratory organs are not inflammatory in themselves, but may result in inflammation. Among the causes of diseases of the organs of respiration we might mention chill, working on too full a stomach, and when in a low condition. The great and sudden atmospheric changes to which we are liable in this colony are ready and frequent causes. We are told the diseases of the lungs and air-passages constitute more than one-half the ailments to which horses are subject, and they are most prevalent during the extreme changes of temperature.

We have heard the horse cough. Cough is not a disease in itself—it is a symptom. When you hear a cough be sure there is irritation existing somewhere about the respiratory organs. There are two things to be noted here—the part irritated, the degree to which the disease has advanced. By applying the ear to different parts we may be guided to the seat and nature of the disease, and much valuable information obtained. I understand that there are no fewer than seven different classes of cough distinguishable in the horse—The hard dry cough; moist cough; rattling cough; soft, chronic, short, and deep hollow cough. In distinguishing the diseases in the respiratory organs it is essential to have a knowledge of the various classes of cough. This I know requires much practice.

We may have seen horses affected with a common cold, *i.e.*, acute inflammation of the

mucus membrane which lines the nostrils and upper air passages. It is the same affection as that known in our own system as cold in the head.

No better treatment can be used than steaming the head frequently, keep warm, and give, say, from two to four drachms of nitrate of potass in the mash or water. I should not advise purgative medicine; but if the bowels are constipated I should give a dose of Epsom salts with the nitrate of potass. Sometimes a stimulant is necessary; then I would give spirits of nitric ether along with acetate of ammonia. A common cold should never be neglected, as more serious diseases may ensue.

Bronchitis is another disease to which the horse is subject—inflammation of the bronchial tubes. As you may know, there are two kinds of tubes—the larger and the smaller; the inflammation of the latter is by far the most dangerous. If you have reason to suspect bronchitis you must notice the state of the breathing. To a practised eye this is noticeable at once. The first positive symptom is the quickened breathing; a slight whistling or hissing sound is heard at the sides of the chest. Sometimes a more deep and noisy sound may be heard in front of the chest. It is chiefly on these sounds we are able to distinguish between inflammation of the larger or smaller tubes. The reason of this sound is the passage of air over the dry inflamed membrane. The best treatment will be, first, warmth, a restricted diet, and a few doses of spirits of nitric ether with some acetate of ammonia. This treatment, if used early, will in most cases arrest the disease before fully establishing itself. Should the disease fully develop, then the only course is to assist nature on to what is termed the moist stage. Sedatives, such as opium, should be avoided. Salines may be freely used, say half ounce of the chlorate or nitrate of potass in the water or mash. In case of weakness, of course diffusible stimulants will have to be given, the best possibly being carbonate of ammonia. Nitre might be useful until the kidneys act freely.

Pneumonia is a frequent disease among horses. This is an inflammation of the substance of the lungs. The attack frequently comes on suddenly, at other times more imperceptibly. You have reason to suspect an attack when you notice sudden fits of shuddering accompanied by cold extremities. The horse, with great restlessness, turns his head to his chest. A very marked symptom is the horse stands with his forelegs wide apart. Nature leads him to this because it affords greater expansion to the chest. The head is inclined downwards, with the nose and nostrils projected. The breathing is quick, being very irregular. The sound of the chest is peculiar, being of a confused humming noise, this giving place to a moist rattle as the disease progresses.

There is another disease which is closely allied to this, viz., pleurisy, an inflammation of the delicate membrane which forms the coverings of the lungs and also lines the cavity of the chest. You may invariably decide that your horse has got pleurisy when you turn him somewhat quickly—you will hear a sharp clear grunt, or if you apply pressure to his side. The pulse is hard and quick; respiration is short and quick; there is great restlessness.

Now sometimes you have both these diseases combined, and it is then termed pleuropneumonia. To distinguish the symptoms requires great practice and skill. But now a word as to the treatment. At first I should use a sedative in the form of aconite every four or six hours until fever shows signs of abatement. I should use somewhat freely the neutral salts dissolved in water. My opening medicine would be Epsom salts. After the disease has progressed I should use, during the moist stage, carbonate of ammonia with gentian and ginger. But we must remember that the remedies will need to be changed as the disease runs its course. One thing I may mention—how necessary it is to keep the horse at the commencement of the disease on a laxative diet. As to external treatment, I am adverse to irritants, as I am in the case of a human being, chiefly on the ground of conserving the strength of the patient.

I do not think it is necessary in our limited time to speak of the chronic cough, thick wind, roaring, whistling, broken wind, or consumption.

There is, however, another disease that I should like to say a word or two about, and that is influenza. It is a specific disease, in which we find fever, symptoms of cold, loss of appetite, weakness, complicated with liver and lung diseases generally. The nervous system is very much affected; indeed, so much so that you would suspect pressure on the nerve centres. The cause of this depression is the presence of a specific poison in the blood. Our knowledge of its nature, causation, and appropriate treatment is somewhat imperfect. To this generation it is practically a new disease. Some knowledge we have, and I think that every possible care should be taken to note the peculiarities of this disease. It varies so very much in different horses. There are many cases, without doubt, where the symptoms are so undefined, the attack so slight, that little or no attention was paid than that of a common cold. From what we do know, the disease has its origin in some peculiar condition of the atmosphere, the exact nature of which we must confess our ignorance. Atmospheric causes may generate the disease, but they are rarely sufficient to develop them. There are evidently other debilitating and poisoning influences: what



these are we are not in a position to say. Let me say, however, whatever may affect adversely the general health may predispose to and tend to propagate and disseminate the disease. The system of the horse is evidently reduced to such conditions that when the poison comes it finds a suitable medium for its development and growth.

Now, of all diseases, this requires to be taken in its very earliest stage. The thermometer will readily detect the early attack. The first essential thing to do is to give complete rest. Very much depends on this. I scarcely know what to say as to treatment; it requires not so much the regular education of the veterinary surgeon as experience in practice, for it is a disease that varies so much, and has so many phases, that it can only be treated according to the symptoms presented by each case. You will at once see from this the special difficulties to the investigator. But there are special symptoms that require special consideration. In some seasons the disease assumes a high inflammatory character, whilst in others it takes a low form. We may, however, refer to what we call those special symptoms of a general type without going too much into the details of particular features. The first thing noticed the horse is dull, weak, and dispirited; sweats on exertion; his appetite fails; his coat looks unnatural; urine becomes thick and scanty; the dung is glazed, and sometimes coated with mucus; mouth is hot and unnaturally dry; we have noticed a yellowish-red hue. The temperature is unusually high, the pulse is quick and oppressed. You would think he suffers from headache; if he moves he staggers in his walk. Such symptoms point clearly to the nervous centres being deranged, especially the brain.

At first some simple fever medicine may be required. Should there be noticed watery eyes, swollen eyelids, swelling of the legs or under the belly, we must remember these are signs of extreme debility. In these cases stimulants may be required; ammonia, camphor, and ginger, with nutritive gruels, will be necessary. The discharge from the nose of matter may be regarded as a favorable symptom. What is necessary to watch is the complications of mischief in important internal organs. Shivering is an unfavorable symptom, as is also embarrassed breathing. There may be profuse perspiration, which in a measure relieves the other symptoms.

Sometimes, however, the attack takes an unfavorable turn and becomes complicated with pneumonia, the liver, fever, and other symptoms. Things become critical then, and the greatest care and caution are needed. Stimulants become necessary; sedatives may prove injurious. The nerve centres are always paralysed. Then it is we ought to rouse the flickering flame of life. Often we get the intermittent form, gaining strength for a time, followed by relapses. And sometimes after recovery we have after results, such as rheumatism or paralysis. I have noticed that sores or wounds of a simple kind will take an unhealthy turn from no apparent cause. Caution and watchfulness are very necessary in applying strong blisters or irritant to the skin. The liver often is functionally deranged, the air passages are more or less affected, the lungs are sometimes inflamed, and the alimentary canal is always more or less involved. The kidneys are always more or less affected, as is also the heart; the depression of the power of the nervous centres is a main characteristic of influenza, and affects the action of the heart.

Let me close by asking consideration for the horse; he is a creature that needs our care and aid. If there be any animal deserving the service of man, it is the horse. They feel pain and suffering as keenly as we do ourselves, and it is certain they appreciate kindness as well as are conscious of cruelty.

### Millicent, December 2.

Present—Messrs. R. Campbell (Chairman), S. J. Stuckey, H. Hart, H. Oberlander, H. A. Stewart, G. Tantram, W. Whennen, B. Varco, and E. J. Harris (Hon. Sec.).

SEED POTATOES.—Mr. Whennen said potatoes for seed for general crop required to be kept in a dry, airy place; for early potatoes it was best to grow two crops in the year. Mr. Stewart quoted from "Brett's Colonist's Guide," advising a place with basket sides, thatched roof and raised earth floor. Mr. Stuckey said he had heard it recommended to keep them outside with a bark or thatch covering.

FODDER CROPS.—Mr. Stewart reported having sown kale in a self-sown crop of rye. The rye having been fed off he ran a furrow with a potato moulder, and a drill following through the field. The rye was now being cut, and the kale, which looked very promising, being in the furrow escaped the

mower knives. At intervals strips of rye 10ft. to 12ft. wide were left. Members thought this a good idea for preventing the land drifting.

**EXPERIMENTS.**—Mr. Stuckey reported having sent potatoes to Adelaide in cases, but it did not pay. The potatoes did not fetch usual market prices, and he was also charged extra for rail freight on the cases. Mr. Whennen reported very favorably of Profusion and Quantity peas.

**CROSS-BRED RAMS FOR BREEDING PURPOSES.**—The Chairman introduced the question of the use of cross-bred rams, and stated he had heard favorable reports from those who had been experimenting in this direction. Mr. Stuckey strongly opposed the practice. A large sheepbreeder in the district had used cross-bred rams with very unsatisfactory results. He got large fleeces, but to use his own words "they were as light as feathers." Mr. Hart had tried the experiment; he got good mutton sheep, but the fleeces were a failure.

### Port Elliot, November 27.

**Present**—Messrs. C. H. Hussey (Chairman), D. H. Cudmore, H. Pannell, J. Virgin, J. Brown, F. T. Fischer, E. Darwin, O. J. Whitmore, H. Green, E. Wood, P. O. Hutchinson, and three visitors.

**POTATOES FOR SEED.**—Members were of opinion that the best method of keeping potatoes from one season to another was to store them in a loft under a thatched roof, admitting as much air as possible, taking care that the light is excluded. The potatoes should not be heaped up, but spread out as much as possible. Another good plan is to lay them out singly on open shelving in a cool, dark place. Where the soil is rich and irrigation possible several crops may be grown in one year by sowing again as soon as the potatoes are ripe. To guard against damage by caterpillars it was suggested that the potatoes should be placed in cold water for twelve hours and then stored in a cool, dark place above ground.

**PESTS AND HOW TO DEAL WITH THEM.**—Mr. Hutchinson read the following paper on this subject:—

Probably from the title of this paper it will be thought that I intend to point out the various pests of the farm, orchard, and garden, and then state what remedies I consider best to destroy them. I propose, however, to treat of another aspect of the question, and though some may think I am treading almost on forbidden ground by going very close to the political side, yet my excuse must be the importance of the subject. I am of opinion that those interested in agricultural and horticultural pursuits are more likely to be in a position to know what are the best methods of coping with pests than legislators who have probably very little practical experience in agronomy. I hope that the various Branches of the Bureau will discuss this question of dealing with pests, and that the Central Bureau will summarise the opinions and forward the method most approved to the Minister of Agriculture, so that legislation likely to be useful in coping with pests, and agreeable as far as may be, to the majority of growers, may be adopted. It appears to me that we want experts ever on the alert to report the introduction of pests, and that there should be a body in existence possessing authority to deal with them immediately they are reported. We cannot expect legislation in any particular case until a pest has become a nuisance, because members of Parliament are not likely to take action until requested by their constituents, and these latter will not trouble themselves, as a rule, until the pest makes itself felt. Would it not be better for all growers to contribute a trifle per acre to form a fund to deal with pests in their infancy, so to speak, than to save that trifle and in a few years have to spend large sums of money in checking the pest? Take the codlin moth as an example. Knowing as people did what it was in other places, would it not have been far better, much more easy, and less costly had extreme measures been taken directly it was known to be in the colony than to have experimented with it all these years, and find that now it has gained a footing in almost every horticultural district of South Australia. If I thought it could be effectually stamped out even now I should say it would be better for the clean orchards to contribute towards the cost of compensation necessary through the forced destruction of fruit than let the pest spread

and continually have to fight it. I am afraid, however, that the codlin moth has come to stay, and that however conscientiously and systematically the destruction of damaged fruit is carried out some moths will escape. What are we to do? Shall we leave it to the growers to take care of themselves? I would say yes if they would guarantee to keep their own pests on their own grounds; but suppose ninety-nine try to exterminate them, is it fair to allow the hundredth to keep up a supply? I should like the various Branches of the Bureau to study that aspect of the question. Take the stinkwort as another instance. That probably might have been eradicated if taken in hand at the start. Now it would be cruel to enforce its destruction, as it would in many instances cost more than the land is worth; hence it has not been declared a noxious weed. The conclusion I have come to is that we should have some body appointed to do all in their power to prevent the introduction of new pests, and whose duty it would be to take thoroughly effective action if any new pest appears, believing that the first cost in this way to be the least. Where pests have been allowed to get a hold I would say endeavor to stamp them out where there is reasonable hope of doing so, but when they get beyond that stage it is a question whether we are justified in continually putting growers to expense to no good purpose.

**VISIT TO HOMESTEAD.**—This meeting was held at the residence of Mr. Brown. His property is situated on the Hindmarsh river, from which he gets a plentiful supply of water for irrigation purposes without any expense for pumping. Most of the soil is rich alluvial, and by the aid of plenty of water produces good crops of vegetables. The fruit trees, which look well and promise a good crop, include a large Turkey fig tree planted over forty years ago by one of the early settlers, Mr. A. F. Lindsay. After inspecting the garden the visitors were entertained at tea by Mr. and Mrs. Brown.

### Kanmantoo, December 3.

**Present**—Mes-rs. T. Hair (Chairman), J. Downing, J. Hair, F. Lehmann, A. Hair, W. G. Mills (Hon. Sec.).

**WILD OATS.**—Mr. Hair wished to know the best way of getting rid of wild oats. Mr. Lehmann said he ploughed a dirty field 6in. deep, with the result that the next crop was fairly clean, but the following crop was nearly all oats. Mr. Hair found cropping with Cape oats for two or three years tended to keep them down. Mr. Mills had been successful in cleaning one paddock, which was so dirty that practically nothing but wild oats could be grown. He grew summer crops on this land for two years in succession, and then put in cereal crops.

**MANURES.**—Mr. Lehmann asked which was the best manure for a light, sandy, moist soil, with a rainfall of 20in. per annum. Some members advised Kangaroo Island guano, and others Thomas phosphate. Mr. Hair asked what manure should be used on light limestone soil, the rainfall being about 16in. Mr. J. Hair asked what manure to use on stiff red clay land with an 18in. rainfall. He had used basic slag, but although the crop grew luxuriantly during the wet weather it blighted off badly as soon as the dry weather set in. Mr. Lehmann thought a light dressing of stable manure would give most satisfactory results, while Mr. Mills advocated ploughing the manure in deeply. Members would like information on this subject.

**FROST AND POTATOES.**—Mr. T. Hair asked how to preserve early potatoes from the effect of frost. He had seen it recommended to cover them with straw, also to make smoke fires on the windward side of the crop. The Chairman said he had tried an experiment on a small scale which had proved very successful. On the sunny side of his potato plot he erected a rough brush fence of forked stakes and pine rails with the brush laid over them. Mr. Mills said early potatoes should be planted where the first rays of the sun did not fall.

**THRESHING MACHINES.**—Mr. Lehmann said an implement much needed

was a cheap thresher requiring only a few hands to work it, as he did not believe in the header, and would like to know whether such a machine was obtainable.

**CHAFFED STRAW.**—Mr. Mills asked best method of steaming chaffed headed straw. Mr Hair recommended using an old iron tank with a tightly fitting lid. Fill up with straw in the evening, pour in boiling water, cover up and let stand until morning. Only one day's supply should be prepared at a time.

### Robertstown, December 8.

Present—Messrs. N. Westphalen (Chairman), A. Day, F. Fielder, H. Rhode, A. Hempel, and B. A. McCaffrey (Hon. Sec.).

**KAPUNDA CONFERENCE.**—Members agreed to be represented at the proposed Conference of Branches to be held at Kapunda about March next.

**MANURES.**—Some discussion took place on Mr. Krichauff's paper on Manures, also on Smut in wheat.

### Pyap, December 3.

Present—Messrs. K. F. Huselius (Chairman), T. Teale, T. Smith, C. Billett, F. Muirhead A. J. Brocklehurst, W. C. Rogers (Hon. Sec.), and one visitor.

**SELECTION OF SEEDS.**—Mr. Teale thought that by continually selecting and resowing the earliest ripening heads of wheat, they would in time suffer very little from the dry hot seasons. With other plants similar results could be obtained. If they desired to get late crops they should select the late-maturing fruits. The Chairman said he had known excellent results obtained from use of shrivelled grain for seed, though there was a risk of the plant dying off if dry weather set in shortly after germination. He agreed with Mr. Teale as to selection of seed for early or late crops. Mr. Brocklehurst believed seed should be properly matured to give good results. Onions, if planted out of season, go to seed. He was of opinion that by selecting seed from the earliest varieties, and forcing them where practicable, their early onion crop would be assured.

### Watervale, December 6.

Present—Messrs. C. A. Sobels (Chairman), A. Leithbridge, H. Beck, E. Treloar, W. Smith, T. Stewart, J. Riley, H. Badcock, and E. E. Sobels (Hon Sec.).

**CATERPILLARS.**—Members reported great damage by caterpillars, vegetables and other low-growing crops suffering severely. Summer fodder crops have in many cases been practically destroyed. Members never remember a worse season in this respect.

**CROPS.**—The continued hot weather has ripened off the wheat crops too fast, the grain suffering in consequence. The heads are so brittle that they break off. The crops are well-grown, but generally the grain will be rather inferior. Steinwedel wheat appears to be giving best results, owing to its early ripening. The setting of fruit is very thin, though the trees blossomed very well. Some members attributed the failure of setting to the dry weather, and others to windy weather at blossoming time. The trees are very clean, and show no signs of disease. The leaves have also fallen from the citrus trees in many gardens, owing probably to dryness. In consequence of the poor apple crop it is thought that very few growers will join the Fruitpacking Union being formed in Clare and surrounding districts for the purpose of exporting high-grade fruit.

**Nantawarra, December 6.**

Present—Messrs. S. Sleep (Chairman), J. W. Dall, J. Nicholls, A. Herbert, A. L. Greenshields, C. Belling, H. J. C. Meyers, R. Nicho'ls, jun., and T. Dixon (Hon. Sec.).

**BUNT.**—In reply to questions, Mr. J. Nicholls considered there was no danger of bunt if the seed is properly pickled, and put back into bags similarly treated. Many farmers put their wheat back into the old, unpickled, bags, consequently the seed is re-infected, as the spores in the bags are not injured. Several members said they had often noticed that wheat sown after a light rain is apt to get bunted. They had not noticed heavily pickled seed to be liable to black rust, though wheat sown dry was more subject to this disease than if sown wet.

**Mount Bryan East, December 4.**

Present—Messrs. T. Best (in chair), J. Prior, W. Bryce, R. Webber, W. H. Quinn (Hon. Sec.), and two visitors.

**MIXED FARMING.**—A discussion took place as to whether dairying combined with farming was more profitable than sheep breeding. With one exception the members were of opinion that in this district it was more profitable to keep sheep, and go in also for wheatgrowing.

**CATTLE DISEASE.**—Mr. Prior reported sudden death of young milch cow. It was in good condition, running in a paddock of self-sown oats. The cow was quite well when milked about 6 o'clock in the evening, but died about two hours later, suffering from vomiting and swellings in the loins.

**Meadows, December 6.**

Present—Messrs. J. Catt (Chairman), T. B. Brooks, W. J. Stone, G. Ellis, D. Tester, T. A. Buttery, G. Rice, T. Usher, W. Nicolle, H. V. Wade, W. A. Sunman (Hon. Sec.), and one visitor.

**POTATOES FOR SEED.**—Members considered the best way to keep seed potatoes is to stack them in a heap in a dry room or shed, keep them well covered up, and turn them once and remove the shoots.

**JAPANESE DATE PLUM.**—Mr. Tester tabled dried Japanese date plum, which was sampled by members, and much appreciated. Members thought, if packed in sugar, this fruit would be equal to the best dates. Mr. Tester wished to know best way of drying the date plum.

**BRANCH SHOW.**—It was decided to hold the annual show of produce of the district during March.

**Riverton, December 11.**

Present—Messrs. W. J. Andrew, (in chair), T. Gravestock, D. Kirk, F. Chapman, H. B. Welch, F. Badman, Dr. Allwork, O. H. Castine, M. Badman, and H. A. Hussey (Hon. Sec.).

**KAPUNDA CONFERENCE.**—It was decided to join with Kapunda Branch in holding a Conference of Branches next March. It was also decided to recommend that a show of farm and garden produce be held in connection with the Conference.

**AGRICULTURAL CLASSES.**—It was resolved—“That, in the event of the Government deciding to give technical instruction on agriculture in State

schools, or by means of classes, this Branch respectfully suggests that one or two teachers be specially trained, and then travel through the agricultural districts imparting knowledge to the public."

**DISEASE OF TOMATOES.**—Dr. Allwork reported disease amongst his tomatoes. The flowers appear all right, but a few days afterwards a ring appears round the stem about an inch away from the flowers which gradually wither and die off. Mr. Gravestock reported similar disease in his plants.

**EXHIBITS.**—Mr. Gravestock tabled the following wheats grown in plots without cultivation or manure:—Dart's Imperial, 3ft. 2in. high, well stooled, large well formed heads, pinched grain; Gravestock's Frampton, 3ft. 2in. high, fairly stooled, good straw, large well-formed heads, large but slightly pinched grain; Cowan's Purple Straw, 2ft. 9in. high, very uneven growth, heads generally poor and grain much shrivelled.

Dr. Allwork tabled sample of Chatsworth lemon picked six weeks previously in splendid condition.

### **Mylor, December 4.**

**Present**—Messrs. W. H. Hughes (Chairman), P. P. Probert, S. Pearce, F. Rosser, W. Nicholls, F. G. Wilson, S. Roebuck, W. G. Clough (Hon. Sec.), and three visitors.

**POTATOES FOR SEED.**—Mr. F. G. Wilson stated he had kept potatoes in cases in a cool shed for twelve months without any loss. Mr. Nicholls said he had kept them for eighteen months stored in the tunnels made in excavating in the pipeclay. Other members advised storing in cool dry airy rooms on bunks or ledges, with ventilated bottoms to let the air circulate through them. A change of seed from the plains is found beneficial.

**EXHIBITS.**—Several exhibits of produce were tabled, including Skinless pea, 5ft. 6in. high; Quality pea, very early; Profusion pea, good, but not equal to Yorkshire Hero for market purpose.

### **Lyrup, December 7.**

**Present**—Messrs. A. Pomeroy (Chairman), D. Thayne, E. J. Dwyer, F. E. Chick, T. Nolan, A. Weaver, W. Healy, P. Brown, T. R. Brown, W. H. Wilson (Hon. Sec.), and two visitors.

**POTATOES.**—Mr. Nolan reported that he found, on digging his potatoes, the seed was as firm and solid as the day it was planted. Members thought this due to want of water.

**EXPERIMENTS.**—Mr. Pomeroy reported on numerous trials with seeds of grasses and other fodder plants received from the Central Bureau, many of which promised to be of great value. He also stated that his plot of Danish Island oats, though twice eaten by the cow, was 3ft. high and well headed. Mr. Bennett tabled grain of Dart's Imperial wheat, grown on a poor piece of ground 40ft. x 13ft. The grain was of splendid quality, and the yield very high; the plot, which was irrigated, yielding at the rate of 75bush. an acre! The straw was of good quality, and members strongly recommended this wheat for hay.

### **Mount Pleasant, December 10.**

**Present**—Messrs. G. Phillis (Chairman), P. Miller, jun., J. Maxwell, H. A. Giles, W. Vigar, F. Thomson, W. Lyddon, J. F. Miller, J. McConnell, and H. T. Hull (Hon. Sec.).

**HARVEST.**—Samples of the new crop were shown, the varieties being Purple Straw, from Tasmanian seed; Steinwedel, going 62lbs. to the bushel; Clubhead, &c. A discussion ensued on the crop prospects.

**CATERPILLARS.**—Members reported extensive damage by caterpillars, potatoes, mangolds, and tomatoes being specially attacked. Mr. P. Miller recommended turning ducks into the gardens, as they would destroy many of the caterpillars.

### Forster, December 6.

**Present**—Messrs. A. Johns (in chair), S. Sears, J. R. Bolt, J. Prosser, F. Towill, F. Johns, J. Sears, S. H. Plummer (Hon. Sec.), and W. G. F. and H. H. Plummer, of Browhill Branch.

**RULES**—The rules of Bowhill Branch were read and explained by Mr. W. G. F. Plummer, and adopted as the rules of this Branch.

**WEEDS.**—Mr. S. H. Plummer initiated a discussion on the eradication of sheepweed, by reading a short paper on the subject. Members mentioned that paddocks which had been apparently cleared of the weed by leaving out of cultivation, or by ploughing the plants under, became dirty on again being cultivated. It was suggested that shallow ploughing was best, as it left the seed near the surface, so that they germinate readily and can then be destroyed. By ploughing deeply the seeds are turned right under, only to be brought to the surface again at next time of ploughing. The Chairman said, in addition to sheepweed, charlock and mock cabbage were becoming a nuisance, and should be at once dealt with. He had pulled a lot of the latter by hand, and would need to keep at it.

### Mount Gambier, December 11

**Present**—Messrs. J. Umpherston (Chairman), J. C. Ruwoldt, T. H. Williams, J. Watson, M. C. Wilson, J. Bowd, T. Edwards, A. J. Wedd, and E. Lewis (Hon. Sec.).

**BRANCH BULL.**—Mr. Ruwoldt reported that eleven cows had been served by the Jersey bull, Royal Progress, loaned to the Branch by the Department of Agriculture. They were all good milkers, and he had already a number of other cows promised. Several members reported having inspected the animal; they were well pleased with his appearance, and somewhat surprised at the size of the animal.

**POTATOES FOR SEED.**—Mr. Ruwoldt said he presumed the information the Central Bureau desired was the best way of keeping the early crop over the summer. He kept his in a soap box, in a cool airy place. Mr. Wedd said if they left the potatoes out in the sun for a while to green they would keep well when stored. Other members stated the potatoes should be kept in a cool, dry, airy place.

**CODLIN MOTH.**—Mr. Williams said he had inspected about sixty of the local fruit gardens, and found some of them in a very dirty state. Many of the bandages put on the trees last year had not been removed, and served as breeding places for codlin moth. In other instances the apple trees overhung old buildings, in the crevices of which the moth was bred, and unless the trees or the buildings were removed they would never get rid of the moth. He had been inspecting the fruit closely, and collected about 300 apples in which the grub had entered, and in every instance the fruit had been penetrated at the side, and in no instance at the calyx. He believed they usually went in at the side, bored in to the pip, and often came out at the same places they entered. He was sure they were the codlin moth caterpillars, as they were the same

kind that he saw with Mr. Quinn when he was here. Professor Singerland, one of the best authorities, said the grub went in at the side. He would urge all who were in earnest in the eradication of the pest to go round their orchards now and pick off and destroy all infested fruit. Mr. Edwards said that large numbers of little black and white birds, known as shepherd's companions, were on his ground now eating every sort of moth and bees. They had destroyed every bee. Mr. Watson said he had observed that the codlin moth caterpillars usually entered from the side of the fruit; there was another caterpillar which did some damage by eating round the stem of the apple.

**STOCK COMPLAINTS.**—Mr. Williams said as tapeworm in lambs was becoming prevalent he would strongly recommend immediate attention. In regard to impaction of the omasum in cattle, which usually became troublesome at this season of the year, he would mention that at Naracoorte Branch last year he suggested that it might be beneficial if stockowners put Epsom salts in the cattle's drinking water, in addition to sulphate of iron and salt. Each animal would require about three packets of salts twice a week. Mr. Hunt, of Naracoorte, had tried this plan since, and reports satisfactory results. Members thought they could not do better than recommend liberal use of sulphate of iron and salt.

### Koolunga, December 9.

#### INAUGURAL MEETING.

Present—Messrs. E. J. Shipway, R. Palmer, jun., T. B. Butcher, G. Pennyfield, J. Button, J. Butterfield, J. Jones, J. Sandow, R. H. Buchanan, and W. Ballinger.

**BUSINESS.**—Messrs. T. B. Butcher, J. Sandow, and G. Pennyfield were elected Chairman, Vice-Chairman, and Hon. Secretary respectively. Formal business in connection with the work of the Branch was dealt with.

### Gawler River, December 9.

Present—Messrs. A. M. Dawkins (Chairman), T. P. Parker, H. Heaslip, R. Badcock, J. Hillier, F. Roediger, A. Hatcher, J. Bushbridge, H. Roediger (Hon. Sec.), and one visitor.

**PURGING HORSES.**—Mr. Parker read a short paper on this subject. He said horses of every description needed purging occasionally. Horses kept on dry feed and not much exercised require regular purging at least twice a year. Horses subjected to hard and continued labor also require regular attention in this way. If this is done many losses would be avoided. Some treatment is necessary before giving the animals purgatives; otherwise inflammation and even death may result. He found the best way was to give mashies of scalded bran and oats, with warm water, for three or four days, and then give the purgative. As a purgative ball mix 5 drams or 6 drams Barbadoes aloes, 1 dram ginger,  $\frac{1}{2}$  dram prepared kale in sufficient palm oil to form a ball. When the physic has done working give, as a restorative, a mixture of 1 dram tartaric antimony, 2 drams each aniseed and carniseed, 1 dram ginger, and sufficient Venice or turps to make up into a ball. He preferred a ball to a drench as many people waste half the drench in giving it to the animal. To give a drench he raises the horse's head by means of a rope, to which is fixed a leather strap, the latter being put in the horse's mouth, and the rope drawn up through a pulley overhead. Mr. H. Roediger said he gave his horses crushed linseed in the feed twice a year to cause a slight purging; he gave about 1 bush. of linseed to four horses in a week. Members advocated use of salt, and also of mixing salt with the hay when stacking.



**Port Germein, December 18.**

Present—Messrs. P. Hillam (Chairman), T. S. Marshall, E. McHugh, W. Crittenden, W. Mortess, W. Broadbear, H. H. Glasson, J. K. Deer, J. Bews, and H. J. Gluyas (Hon. Sec.).

**APRICOT DISEASE.**—Mr. Hillam tabled specimen of disease attacking his apricot trees. The first sign of the disease is a brown, burnt appearance on the outside edge of the leaves, which gradually spreads until the whole of the leaf is affected. The limbs gradually die; generally in the third season the trees succumb. They set fruit freely at first, but it does not ripen well. Out of ninety trees planted about five years ago, only thirty are now left. The orchard is freely irrigated during the spring months.

**NON-SETTING OF FRUIT.**—Mr. McHugh reported that all his trees had failed to set fruit, the buds dropping off. They had plenty of water in the winter and spring, and made good growth, the foliage being dense. Some of the trees had been pruned well back and others very lightly, but the result was the same.

**FLAX.**—Mr. McHugh reported that his flax grew fairly well, but had been completely destroyed by "grubs."

**Maitland, December 4.**

Present—Messrs. C. F. Heinrich (Chairman), H. R. Wundersitz, A. Jarrett, J. Smith, J. S. McLeod, H. Pitcher, O. Treasure, J. Kelly, J. Hill, and C. W. Wood (Hon. Sec.).

**SEED WHEAT.** Mr. Smith's paper on "Selection of Seed" was well discussed. Mr. Jarrett strongly advised each farmer to select the best heads in his crop and propagate these for seed. He had carried out this practice with very satisfactory results. Other members agreed. Most of the members considered pickling with blue-stone injurious, as much of the grain was so injured that it failed to germinate, and what grew was weak and spindly as compared with lime-pickled or unpickled seed. Several intimated their intention of pickling with lime at next seeding.

**VISIT TO HOMESTEAD.**—This meeting was held at residence of Mr. Jarrett, for the purpose of seeing his heading machine at work. Members were greatly pleased with the result, and consider it will pay well to cut portion of their crops, when good enough, with the binder, then thrash or head the sheaves and save the straw. They thought such straw would be quite as good for feed as much of the self-sown wild oat hay so common on the Peninsula.

**Cherry Gardens, December 14.**

Present—Messrs. J. Potter (Chairman), T. Jacobs, J. Lewis, C. Lewis, G. Hicks, J. Mackerett, J. Choate, R. Gibbins, J. Metcalf, E. Wright, C. Ricks (Hon. Sec.), and one visitor.

**POTATOES.**—Mr. Potter read a short paper on this subject. He recommended a mixture of horse and cow dung with leaves and decaying rubbish from under the trees. This should be carted and spread in dry weather, about a month before planting, so as to allow the seeds in it to germinate. Before planting, scarify or scuffle the ground twice to destroy the weeds and bring the soil to a fine tilth. Be careful to select good seed; it will pay better to give 7s. per cwt. for good seed than 5s. for inferior; in fact, it is only a waste of time and land to sow the latter. For early planting Beauty of Hebron and White Elephants are best. Plant in June or July, so as to dig them just as the crops on the plains have finished. After planting, harrow the ground well, and if at

all rough roll also just before the plants show through. Hoe when about 4 in. high, selecting fine weather for the operation. They should be earthed up after a light shower or on a dewy morning, and not in dry weather. The question of keeping seed potatoes was discussed. Members considered the best way was to leave them in the ground till quite ripe; then dig and stack them under a tree, and cover with a little grass or ferns to protect them from the frost, letting them green. They also agreed that a change of seed from the hills to the plains, and *vice versa*, was a good practice. On wet land, by planting in January, new seed is ready for spring sowing.

EXHIBITS.—Exhibits of Dart's Imperial wheat, 4ft. 6in. high, with long ears; Profusion, Quantity, and Quality peas of good quality were tabled.

CATERPILLAR PLAGUE.—Members reported serious damage to many crops by ravages of caterpillars, which are very numerous, the potatoes and onions being badly attacked. A mixture of Paris green or London purple, bran, and treacle, honey or sugar, has been found very effectual in lessening their numbers.

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that during the past year twelve meetings were held, with an average attendance of nearly twelve members and three visitors. The annual produce show in March proved a great success, and the Conference of Hills Branches was fairly so. The retiring officers were thanked for their past services; Mr. E. Wright was elected Chairman, and Mr. C. Ricks re-elected Hon. Sec., for the ensuing year.

### Mount Compass, December 14.

Present—Messrs. R. Peters, W. Wright, D. Wright, C. S. Hancock, A. J. Hancock, S. Arthur, M. Jacobs, H. McKinlay (Hon. Sec.), and two visitors.

SEED POTATOES.—Members were of opinion that seed potatoes kept best in an open, well-ventilated shed, or outside, spread thinly and covered with some material sufficient to keep off the frost. In this district the seed is kept in this way for the early and main crops, but for late crops the growers exchange seed with growers round Willunga, where the season is much earlier.

CATERPILLARS.—Members reported satisfactory results from use of the Paris green, bran, and sugar mixture for destroying caterpillars.

ONION DISEASE.—Mr. Jacobs reported that his onions were affected by disease known in the district as "Mildew," and asked if there was any cure.

## RECENT PROGRESS IN CO-OPERATION.

(*Journal of the Department of Labor, New Zealand.*)

Returns received from 834 co-operative distributive societies in the United Kingdom, with a total membership of 1,106,836, show total sales for the second quarter of 1897 amounting to £7,908,661, as compared with £7,141,482 in the corresponding period of 1896. Of the societies, 705 show an increase, and 129 a decrease, the net increase being £767,179 or 10·7 per cent.

During the past month three new co-operative distributive societies (two in England and one in Scotland) have been registered, and two in England dissolved.

Two new agricultural and dairying societies and one lace-making society have been registered in Ireland.

A new department has been opened by the English Co-operative Wholesale Society, for the purpose of making advances of capital to its federated societies, to be lent by them to their individual members for the purchase of cottages,

the deeds of the property purchased to be deposited with the Wholesale Society. Advances will be made to the extent of three-fourths of the total cost of the properties, and the societies will be responsible for the repayment of the advances by equal quarterly instalments of principal and interest, spread over a period not exceeding twenty years.

A superannuation scheme has been prepared for the employes of the Wholesale Society and its federated societies. The rules were submitted by the committee at the quarterly delegate meeting, and the question adjourned for three months to permit of consideration by the members of the federated societies.

At the quarterly delegate meeting of the Scottish Wholesale Society, the sum of £3,559 was allotted out of the half-year's profits, as a bonus of 8d. per £ on the wages of the employes in both distributive and productive departments.

Detailed figures showing the recent progress of co-operative societies, making returns for England and Scotland separately, are given in the following table based on returns and reports specially supplied to the Department by the societies:—

Societies making Returns				Sales of Societies making Returns.			
	Number.	Membership	In Second Quarter of 1897	In Second Quarter of 1896	Increase in 1897 compared with 1896.		
					Amount	Per Cent on Sales.	
			£	£	£		
<i>I. Distributive Retail Societies.</i>							
England and Wales	651	923,265	6,318,146	5,711,088	607,058	10.6	
Scotland	189	183,571	1,590,515	1,430,394	160,121	11.2	
Total	840	1,106,836	7,908,661	7,141,482	767,179	10.7	
<i>II. Wholesale Societies</i>							
England and Wales—							
Distributive departments	1,043*	1,042,086†	2,821,586	2,622,885	201,701	7.7	
Manufacturing departments			333,481†	281,500†	48,981†	17.2	
Scotland—							
Distributive departments	287*	200,121†	1,078,907	921,063	157,844	17.1	
Manufacturing departments			248,630†	174,147†	74,483†	12.8	

\* Number and membership of federated societies

† i.e. Transfers to distributive departments.

## THE AMERICAN "GRANGERS."

The latest edition to hand of the *American Agriculturist*, in directing attention to the thirty-first annual session of the National Grange at Harrisburg, writes some highly complimentary statements concerning the Pennsylvania State Grange, which meets in special session at the same time to extend a "royal welcome" to the delegates and visitors. "With a united, aggressive front," it says, "the grange has accomplished more for the agricultural interests of the country than all other farmer organisations combined." It will be borne in mind that the railways in America are owned by private

companies, and that "combines," "rings," and other organisations were formed, and that these all regarded the farmer as legitimate prey, until the farmers also combined and resisted the exactions. In reading accounts of the doings of the grange in America we must not forget that nothing like the same state of things prevails in the Australasian colonies, where the railways are run by the Government with a deliberate intention, as far as is possible, to benefit the producers, whilst at the same time trying to make the traffic cover its own expenses; and our merchants and dealers are too numerous and too anxious to do business at reasonable profits to allow of any conspiracy or combinations for the purpose of securing unjust profits. The *American Agriculturist* says:— "The Pennsylvania State Grange surpasses those of all other states in steady growth, interest, thoroughness of organisation, and actual accomplishments in the securing of just and equitable laws in the interest of the farmer. . . . The great aim . . . has been to build up an organisation that is really valuable to the farmers, as much so as the Board of Trade, Chambers of Commerce, or Corn Exchanges are to the speculator. This high standard of usefulness has been attained by keeping the official control of the order in the hands of practical farmers, who knew by experience the kind of organisation needed. The twenty-fifth annual session of the Pennsylvania State Grange will be a special meeting called to welcome the National Grange, which meets at the capital, Harrisburg, next week . . . The growth of the grange in Pennsylvania has been constant for fifteen years. . . . Of the 1,170 charters issued, 615 are now active." A tabular statement of its membership yearly since 1875 is given, as follows:—

1896.....	22,500	1888.....	16,200	1881.....	9,700
1895.....	23,000	1887.....	13,600	1880.....	11,400
1894.....	25,000	1886.....	11,300	1879.....	16,000
1893.....	25,600	1885.....	9,900	1878.....	5,100
1892.....	25,300	1884.....	—	1877.....	25,700
1891.....	22,600	1883.....	9,300	1876.....	—
1890.....	19,700	1882.....	9,200	1875.....	29,000
1889.....	17,600				

At least 25 per cent. should be added each year for delinquent members.

In addition to a deal of other useful and practical work, the grange has caused the issue of free text-books to all the public schools. "In co-operative financial enterprises the Pennsylvania State Grange has undoubtedly secured larger concessions than any other state grange. To such an extent has co-operative buying been carried on, a quarterly trade bulletin is issued regularly, giving retail prices in figures and the grange discount or wholesale prices by cipher and key. Under such a liberal system the humblest patron can buy his farm implements and supplies in single implement or broken packages, to suit purchasers, at wholesale prices without the intervention of agents, his order being honored upon presentation of trade card by reason of being a member of the grange, and thereby saving from 20 to 25 per cent. upon purchases. Concessions thus made save to patrons between \$50,000 and \$100,000 annually. Commission houses have also been established for the sale of produce and grain, whereby the products of the farm are handled upon the same terms as those of the general dealer.

"In the matter of mutual fire insurance Pennsylvania Patrons are well to the front, having fifteen or more strictly Patrons' Mutual Fire Insurance Companies, one of which carries insurance of \$2,000,000. Patrons support and control many of the mutual companies in the state. The Patrons' Relief Association of North-western Pennsylvania was organised in 1875, and has been in continuous operation since, now having about 1,000 members. The members pay \$1 assessment on the death of each member.

"Aside from the business features of the grange, a wonderful work is being

done for the social and educational uplift of Patrons. Grange gatherings and encampments are well known all over the state. The interest manifested in the discussions and entertaining is unusually earnest, especially on economic questions in which farmers are so vitally interested. Lecturers are kept constantly in the field, especially the state lecturer. Last year Lecturer Hill visited thirty-five counties, going 9,000 miles by rail, 1,000 by vehicle, and 100 on foot. The addresses given have done an immense amount of good, and cheered the hearts of farmers in no small degree. For the larger annual gatherings, such as the Interstate Grange Exposition and the Centre Co. Fair, the best speakers in the country are obtained. But few have any conception of the size of the meetings. As many as 50,000 have attended; entire families attend and camp, and so great has been the demand for tents that the governor on more than one occasion has furnished the tents of the National Guard to give shelter. As far back as in 1885 the exhibits of farm implements, closely packed, covered twenty acres, were valued at \$1,000,000, and sales were made at the fair to the extent of \$300,000. Since then the fair has increased in magnitude and exhibits in proportion. Besides the larger fairs and festivals, nearly every pomona or county grange holds an annual picnic and fair, which has become the recognised annual festival of the year.

"The social good derived from the use of the grange manual, the contact man with man in the grange hall, the zealous support of the lecturer's programme, and the entertainment of visiting Patrons have done more than any other cause, the church excepted, in providing for the social recreation of farmers. He receives in proportion to what he invests in support of the lecturer's programme. With the magnificent organisation now attained, and with the advent of better times over the Keystone State, much greater things may yet be accomplished by the Patrons of this grand old state."

## THE AGRICULTURAL STATISTICS FOR 1896-7.

The report of the statistician for 1896-7, just published, contains a deal of interesting matter, as such reports always do. In regard to the drought, for instance, he quotes Sir Charles Todd:—

There were good and fairly general rains in April, especially over the agricultural districts, a moderate fall in May, and a good average in June; but all the following months were dry, and, combined with an unusually cold July, brought nothing but disaster to the farmers. The rainfall for July, August, September, and October (four months of the winter season) was everywhere far below the average over the whole of the wheat-growing districts.

The total rainfall for the months of July till October inclusive, were recorded as follows:—

Hawker, 2·21in., average, 4·71in.; Carrieton, 2·91in. average, 4·71in.; Orreroo, 2·55in., average, 5·43in.; Tarowie, 2·85in., average, 5·74in.; Jamestown, 3·43in., average 7·93in.; Laura, 4·31in., average, 7·97; Crystal Brook, 3·74in., average 6·38in.; Redhill, 3·69in., average, 7·16in.; Snowtown, 3·38in., average, 6·59in.; Clare, 4·51in., average, 11·21in.; Burra, 4·65in., average, 7·94in.; Gawler, 2·76in., average, 8·49in.; Two Wells, 2·68in., average, 7·27in.; Adelaide, 3·28in., average, 8·71in.; Eudunda, 3·03in., average, 7·66in.; Truro, 2·83in., average, 9·46in.; Sedan, 1·09in., average, 5·28in.; Morgan, 0·99in., average, 3·67in.; Blanchetown, 0·72in., average, 4·36in.; Callington, 4·37in., average, 7·23in.; Woodburn, 4·02in., average, 7·23in.; Strathalbyn, 5·10in., average, 8·71in.; Willunga, 6·43in., average 11·96in.; Maitland, 4·25in., average, 9·08in.; Minlaton, 4·16in., average, 8·17in.; Bordertown, 4·71in., average, 9·25in.; Naracoorte, 5·72in., average, 10·07in.; Penola, 6·37in., average, 12·40; Mount Gambier, 10·57in., average, 14·27in.; Fowler's Bay, 4·42in., average, 4·83in.; Streaky Bay, 6·16in., average, 6·84in.; Port Lincoln, 6·76in., average, 9·36in.; Port Elliot, 5·77in., average, 9·17in.; Robe, 8·38in., average, 11·42in.; Cape Northumberland, 10·45in., average, 12·11in.

There has been no appreciable increase in the area under cultivation in any of the Australasian colonies during the past five years, and in South Australia there was a decrease of 1·57 per cent. In 1890-91 South Australia had 2,649,091 acres under tillage; 1892-3, 2,625,741; and last year, 2,584,395 acres; a decrease of 41,346 acres. During the past thirty years the area under cultivation has increased fourfold, and the demand for land is as keen as ever. With closer settlement and improved methods of cultivation the rewards to industry will be greater in the future than in the past. Sheep-breeding has greatly increased with the agriculturist of late.

Many more sheep are kept on farms in the Lower and Upper North, which ordinarily supply two-thirds of the whole wheat crop, than before the lands were thrown open to agricultural settlement. With a return of good seasons and a more reliable water supply still more attention will probably be devoted to sheep-keeping, dairying, wine and fruit-growing. In regard to wheat it is not too much to expect that production will greatly increase in consequence of the general adoption of more scientific methods of farming, in sowing, manuring, and reaping, which are already proving so successful, in the shape of drill, binder, and header. The colony continues to grow nearly one-half of the entire wheat crop of Australia, and it is a coincidence that the area sown is identical with that of Great Britain. During ten years ended 1894 the average yield of wheat in Australasia was 10bush., and in this colony 7bush. to the acre.

There have been seasons when a thousand-ton ship could be loaded every working day throughout the year with the surplus wheat. In 1879, 1883, 1884, 1887, 1889, and 1893 the harvest was close upon 8bush. per acre, or 15,000,000bush. The average export in those seasons was nearly 300,000 tons. Over 40,000,000bush. of wheat have been reaped in the Upper North during the past twelve years.

Orchards and gardens have increased in area by 50 per cent. during the last ten years. The expansion of horticulture has been continuous and progressive, over 6,000 acres having been added to the ground so utilised, making in the aggregate 18,415 acres, an increase of 2,644 acres, or 17 per cent., since 1892-3. Fruit culture has extended widely; and in various parts of the colony which at one time it was thought were hardly adapted thereto, horticultural pursuits generally have been successfully engaged in. The pioneer work done at the Renmark Irrigation Colony, and at the village settlements on the banks of the Murray, gives promise that intense culture under the influence of irrigation will be firmly established in the near future.

Although an increasing attention is being paid to the preservation and drying of various kinds of fruit, there is still a considerable opening in this direction. The demand for South Australian raisins, currants, dried apples, apricots, &c., far exceeds the supply, and the demand would still increase were there adequate arrangements made for popularising these articles. In 1896 the value of dried fruits imported was £47,663, and of jams, preserves, &c., £8,813, whilst exports were £27,098 and £25,561, respectively.

During the first half of the present decade vine-growing increased by leaps and bounds. In four years the area under vines more than doubled, from 7,352 acres to 15,418 acres, or 8,066 acres additional. Since 1893 only 2,915 acres have been planted, making the present total 18,333 acres. The total number of productive vines is 6,809,737, as against 4,206,880, an increase of 2,602,857, or over 60 per cent. The number of non-bearing vines is 2,493,928, compared with 4,645,737, a decrease of 2,051,809 or 45 per cent.

In 1892 the quantity of wine made was 795,631galls., and in 1896 it had increased to 1,743,090galls.—an increase of 947,459galls. Quantities shipped:—1887, 89,832galls.; value, £23,787. 1893, 260,251galls.; value, £47,300. 1896, 391,233galls.; value, £73,316. Nearly one-fourth of the annual quantity made is shipped. Two tons of white grapes, or three to five tons of table or raisin grapes to the acre is about an average yield. The quantity of wine in stock has risen from 2,578,070galls. to 3,713,381galls., or 50 per cent.

The production of raisins three seasons ago is put at 35 tons, and 354 tons last season, of which Renmark claims 215 tons, Barossa district 66 tons, and vicinity of Adelaide 35 tons. Imports of raisins were 400 tons, and currants

722 tons, valued at £12,125 and £8,632 respectively, notwithstanding the duty of 3d. per pound on raisins and 2d. per pound on currants.

The last few seasons have been disastrous to live stock. The low prices for wool and stock have greatly discouraged stockowners, and the succession of bad seasons has seriously interfered with the natural increase, besides killing off a great number of cattle, sheep, and horses in the Upper North and Western districts and the outer pastoral districts uniformly.

Horses were returned as numbering 180,211, compared with 186,726 in 1893—a decrease of 6,515, or 3·49 per cent. The reduction was chiefly in the South East, where horse-breeding is declining—3,747, or 17 per cent. The loss of horses in the Lower and Upper North—3,373 head, or 9·10 per cent.—would have been much heavier had not the farmers been able to remove them by train to distant places, where feed and water were obtainable, under the nominal rates granted by the Railway Department. The decrease in horse stock in the pastoral districts was 2,287, or 12·93 per cent.; and in the agricultural, 4,228, or 2·50 per cent. only. The number of working stock included in above was 121,930, against 123,151, a decrease of 1,221, or only 1 per cent.

The number of dairy cattle were 84,265, or 1,845 more than in 1893, when there were 79,420; this notwithstanding the severity of the season.

The Central Division has 3,852, the Lower North 2,534, and the Western 252 more; whilst there are fewer by 1,744, 11, and 38 in the Upper North, South-East, and the outside districts respectively.

The total number of cattle imported overland was 20,615, against 2,167 exported, leaving a net import of 18,448 head. During the last ten years 166,369 head have been imported, chiefly fat stock from Queensland.

Last year 110,901 sheep were imported, and 89,333 exported, or only 21,568 difference. During the ten years 2,512,848 sheep were introduced, as compared with 1,235,169 crossed the border outwards, showing an increase of 1,277,679 within that period. As there has been no increase in sheep during that time, it may be inferred that that number of sheep, in addition to 142,029 head of cattle, have been required for food consumption beyond the local sources of supply.

During the past four years the number of sheep depastured has decreased by 828,054, or 11·58 per cent. This is chiefly attributable to low prices of wool and mutton, successive bad seasons, loss of lambs, increase of vermin, and the unprecedented drought.

Seven years back the number of sheep was 6,386,617, about the same as now. In the following year, 1891, they had increased to 7,004,642, or by 9·7 per cent. In 1892 they further increased to 7,646,239, or 9·2 per cent. Next year, 1893, the fall began, the number receded to 7,152,047, or 6·5 per cent., since when it has fallen to 6,323,993, or by 11·6 per cent. in the four years, the gain in the two years 1891-2 of 19 per cent. being lost in the succeeding five. Had there been any increase during the years 1894 to 1896, of which no statistics are available, the loss by drought would have been greater.







# Journal of Agriculture

AND

## Industry.

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### NOTES AND COMMENTS.

The weather during the month has been very hot and disagreeable. Strong hot winds have seriously affected the apple crop in some districts, and the water question is becoming alarmingly serious in many localities. Fruit and vegetables are very scarce and high in price. It is many years since there has been so great a scarcity in these products, and the fortunate few who have good produce to dispose of are receiving very remunerative prices.

“It is a long lane that has no turning.” We have experienced several years of drought, and feed for live stock has always been scarce about June and July. We have every reason to hope for a heavy downfall of rain soon—because we must be getting towards the end of the lane—and it would be worth while to sow a few acres of the fallow with maize and white mustard; also some rye and barley. Maize matures in ninety to 100 days; but we do not want the corn, and the fodder would be of the greatest service where cows are kept. Mustard, rye, and barley grow rapidly under favorable circumstances; and as the risk of loss in sowing a few acres for early feed is very small—even in case of failure—it is well worth the trouble to “gamble” on the chance of early autumn showers.

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The introduction into New Zealand of citrus fruits infested by any species of scale insect, or on which there are traces that any such insects are or have been present, is absolutely prohibited.

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Complaints have been made by vinegrowers in some parts of the colony that the sulphur sold by some merchants is adulterated, and practically useless for sulphuring vines as a preventive of oïdium. Sulphur is too cheap to allow much scope for adulteration; but growers can easily tell for themselves whether their supplies are pure. Place a small quantity of sulphur on an earthenware vessel, set light to it, or heat it over a fire, when the sulphur readily volatilises. If there is much residue left the sulphur has been adulterated.

It is a common thing to see the bark on the trunks and limbs of fruit trees, on the north and north-west exposures, dead and dry. This is caused by the heat of the sun during the later part of the day, and will not happen if the soil is moist enough to cause a rapid upflow of sap at all times. To prevent this killing of the bark it is necessary to shelter the stems and lower branches. If the branches are trained horizontally and low enough this will generally be sufficient, but if this is not done then artificial means must be resorted to. A broad paling will afford a good shelter to the trunk, or a piece of bagging or screen may be fixed up. Do not in any way enclose any tree or plant in a cask or similar contrivance. A free circulation of air is essential to the well-doing of all plants, even around the stems.

Sulphured fruit is most undoubtedly inferior to that which is dried without the use of that acid. Even if every trace of sulphur should have been removed by fire-heat or sun-heat, after the process the flavor of the fruit is deteriorated. But sulphur makes the dried article look pretty or inviting to the purchaser, who generally is ignorant of the process by which this attractive appearance is produced. The sulphured fruit, when cooked, has not that luscious flavor which is present in the unsulphured article. In some cases the flavor of sulphuric acid is most pronounced in the cooked fruit, and somehow the people who partake of it soon lose their liking for dried fruit. The dark-colored peaches, apricots, nectarines, &c., that have been dried without any sulphuring certainly do not look so inviting, but they are much nicer in flavor, and do not create a dislike to this desirable class of food.

In regard to the introduction of American phylloxera-resistant vines the greatest authorities are agreed that this class of vine is just as liable to be attacked by phylloxera as are the European varieties; but the insect is not nearly so injurious to the vitality of the resistant vines. If such vines were established here or elsewhere upon a few acres, and were found to be attacked by phylloxera, it would be necessary to destroy them utterly, in order to prevent the insect spreading to the larger area of non-resistant vines. Such being the case, it would not be advisable to introduce cuttings of resistant vines—which very probably may be infested with phylloxera—until we unfortunately find that the insect has been introduced into our vineyards, and has gained such a hold that we cannot hope to exterminate. When such a dire contingency arises we shall have plenty of time to protect ourselves by the importation in large numbers of the latest and most approved varieties of resistant vines from France or elsewhere, and get them in full bearing by the time the phylloxera has done its worst with our European varieties. In this matter we must keep our heads cool and avoid unnecessary scares.

At the first congress of the Agricultural Bureau of South Australia the late Mr. Frazer S. Crawford read a most valuable paper upon insect and fungus pests; and amongst them included an Australian insect which he called the "Pied Fly-bug." A species of this true bug exists in America, and is there named the "False Chinch-bug." In Victoria it is called the "Rutherglen Fly," but this name is inappropriate, since the pest is common to the greater part of Australasia, and is also common in America, in which latter place it appears to be injurious to cereal crops. Entomologists class this insect as a

species of *Rhyparochromus*. It lives by suction, just as the mosquitoes, aphides, and all kinds of bugs do. The beak, or rostrum, or sucking-tube, when not in use, is folded beneath the thorax, between the bases of the legs, and the insect attacks fruit, leaves, twigs, &c. The wings are semi-transparent, slightly clouded, dirty whitish color. They may sometimes be seen in millions, clustered upon each other on posts, trees, plants, &c. Benzole spray is most effective in destroying them.

On page 519, January issue, of this journal a manifest error occurs through omission of a little space between two figures, which make it appear that 1,650lbs. wheat, at 2s. 2d. per bushel, fed to eighteen pigs, increased their weight by 525lbs., which, at 2½d. per pound, raised the value of the grain to 4s. per bushel, or to £59. By putting a space between those figures the sum is rightly reduced to the correct proportion of £5 9s., leaving out fractions. The motive of the paragraph was to show that the value of the wheat at 2s. 2d. per bushel was raised to 4s. by converting it into pork, and that the farmer gets the benefit of the manure produced. It should also be noted that the carcass upon which the "topping up" is produced may be built up from the weeds and waste of the farm, the farmhouse, and dairy.

Here is a subject for inquiry by branches of the Agricultural Bureau:—Is it a fact that mallee trees which are "mullenised" during January and February never produce fresh growth from the stumps or roots? This question is submitted by Eudunda Branch, the members of which ought to be able to give a reliable opinion, seeing that there is a large area of cleared scrub land in their neighborhood.

Whilst there are a number of items which require earnest and united consideration by farmers, fruitgrowers, and gardeners—or, to express it in one word, by "agronomists"—the question of paramount importance is "united effort," not exactly co-operation, perhaps, but something like the organisation known as the "The Grange" in America, without its ritual and its intense political bias, neither of which is necessary in Australasia, though both were at first required in the United States. A somewhat similar organisation would greatly benefit our rural industries. The agriculturists have established a Farmers' Co-operative Union, which is progressing slowly but surely, and the fruitgrowers in the hills contemplate co-operation. There are immense possibilities in this direction; but much trouble will be experienced in sweeping away the selfishness, distrust, and apathy which stand in the way.

A large number of producers in New South Wales have formed themselves into a "Farmers' and Fruitgrowers' Co-operative Company," with offices at 108, Pitt-street, Sydney, and Mr. G. A. West as secretary. The committee embraces a very large number of practical business men, who are also chiefly large producers. The Co-operation will sell or buy on a low commission for all producers, whether members or not, and will, of course, be in a position to supply fertilisers, stores, implements, and all things likely to be wanted by producers.

Potatoes are very liable to be attacked by the caterpillars of the potato-moth (*Lita solanella*), but if stored in a cool, dark pit the tubers can be kept free from damage by placing saucers on top, at distances from 4ft. to 5ft. apart, and putting a wineglassful of bisulphide of carbon in each. This will kill every living thing, but will not injure the potatoes. Bisulphide of carbon will explode if a light is brought anywhere near it, and will kill cats, mice, and even men, if they are subjected to the fumes for a few seconds.

The proper time to eradicate any weed or to exterminate any pest is just when it is first noticed. Every moment lost in dealing with such things lessens the possibility of stamping them out, and adds largely to the cost of treatment. "Heroic" measures adopted at the first appearance of danger may generally save fearful disaster; but when such first steps have been neglected it behoves every person interested to use his utmost endeavors to cope with the evil. In New South Wales and Victoria the San Jose or Pernicious scale has recently been discovered, and both Governments have declared that all affected trees must be effectually cleansed. But there may be orchards affected unknown to the authorities, and it is the duty of every person knowing of such to put aside all sentiment and at once communicate the fact to the authorities. There is imminent danger that this terrible pest may be introduced into South Australia, and every horticulturist should diligently watch for its first appearance, and if found communicate with the Inspector of Fruit or other official.

There is no occupation in life more healthy, more independent, or more interesting than that of the cultivator of the soil. He can grow or produce nearly everything necessary to his existence. He calls no man master, and if he wishes to knock off work for a day or two he can do so without having to ask leave or to forfeit his pay. No doubt he has his "hard times" now and again; but he is not in the position of the merchant, the artisan, or mechanic, each of whom must be at his office, or shop, or working place every day. A very small proportion of merchants or shopkeepers retire from business with a competence, but the great majority drudge away their lives in close, hot, fusty offices, warehouses, and shops, pay ready cash all the time for stale food of all kinds, and, when they get too old for business, retire to a little place in the suburbs, linger out a few dull years, die, and are forgotten.

## FORESTRY.

### TIMBER TREES FOR SOUTH AUSTRALIA.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

In response to the request of the Agricultural Bureau, I have the honor to report as follows regarding the useful timber trees suitable for planting in this colony:—

The redgum (*Eucalyptus rostrata*) should be planted wherever soil and rainfall will admit, as it is an invaluable timber for all work in contact with ground and water, such as railway construction, fencing, mining, well-sinking, jetty construction, telegraph lines, &c. It requires ample moisture, accompanied by proper drainage, to produce first-class timber, dry sterile sites and swampy sodden ground being alike injurious to its proper development.

The South Australian bluegum (*Eucalyptus leucoxylon*) is a tree yielding timber which for constructing wagons, drays, and other purposes where great strength and durability are required, is of high value; large quantities having been used for naves, felloes, spokes, shafts, &c. The best timber is only to be had from good land, but the tree grows on very varied sites of poor quality, though the timber there is never so valuable, as it generally becomes more or less hollow and unsound. It was formerly known as a "white gum," though latterly regarded by Baron Sir F. von Mueller as akin to the "ironbark" of Victoria.

The sugargum (*Eucalyptus corynocalyx*) adapts itself readily to a variety of conditions, but though it may be of use for shade and shelter when grown on dry sterile soils, it will not mature good timber on any but land of good quality. It makes excellent piles, telegraph poles, fencing posts, and sleepers, and is of considerable value for many constructive purposes. It develops rather more rapidly than the two former gums, and is a most suitable tree for general planting.

The Remarkable pine (*Pinus insignis*) can be planted in the cooler parts of the colony possessing fair elevation and enjoying a good rainfall. It has been extensively planted in the Mount Gambier district, and there produced excellent material for packing cases and other purposes. In the northern district also trees grown by the Forest Department have been converted into timber which has proved well fitted for numerous purposes for which foreign deals are usually employed.

The Aleppo pine (*Pinus halepensis*) grows with greater freedom on a variety of sites than any other pine, and is therefore best fitted for extensive planting. It is slower in its earlier growth than many others, but once established thrives well, provided the surroundings are at all suitable. It is an admirable shade, shelter, and ornamental tree, but if required to produce timber of good quality, must be planted very closely to repress its tendency to waste its strength in side limbs instead of developing a good trunk.

The upright poplar (*Populus fastigiata*) will succeed well wherever there is a moist damp spot round springs and watercourses, and produce a large amount of material well fitted for packing cases, flooring boards, and similar uses, in a small space of ground and a comparatively short space of time. Other species are as good, but do not always succeed so well. It is useless attempting its culture on dry sites.

In dealing with this question I have confined my remarks to such trees as are most likely to suit the conditions of soil and climate existing over the widest average area and have abstained from referring to exotic trees, the culture of which can only be successfully attempted in such specially favored and limited areas as to prove of little commercial importance to the colony.

With reference to the question of trees suitable for planting on the mallee lands of the colony, it may be stated at once that over by far the largest area of land of this nature it is quite useless to expect to grow any kind of tree to such a size as to produce timber of any dimensions. Mallee land is invariably devoid of a good retaining subsoil, and frequently consists of but a few inches of sandy soil, resting directly on a bed of limestone, through which all moisture rapidly drains as through a sieve. The rainfall in the mallee country is also, as a rule, of a very limited and uncertain character. The various species of mallee, therefore, under these circumstances seldom attain any but scrubby dimensions, yielding nothing but firewood and a few small round posts. Occasionally a limited area of land may prove better in quality and possess a good clay subsoil; where such is the case the mallee shows marked improvement in size at once, and in localities of this kind tree planting may prove fairly satisfactory. But even a cursory inspection of mallee land, as a whole,

will convince any practical planter that only dwarf timber will ever be grown there under ordinary circumstances.

Having thus referred to the general aspects of planting on mallee areas, I will now go more into detail on the subject of the particular trees most adapted for the trying conditions generally prevailing there.

The sugargum and bluegum, already alluded to, may succeed where a fairly retentive subsoil occurs, but the redgum will rarely stand any chance to develop properly. The following trees may be regarded as the safest to plant, all things considered :—

The tamarisk (*Tamarix gallica*) grows well even on poor land to about mallee height, and makes fair firewood, also providing in times of drought a useful fodder supply; both may be supplied by cutting back or “pollarding” the tree periodically, after which a subsequent supply may be obtained in a similar manner after a reasonable time.

The white acacia (*Robinia pseud-acacia*) by its hardy nature is well suited for mallee country; it makes good firewood, and the matured timber is hard and durable, well suited for many ordinary country requirements.

The Tree of Heaven (*Ailantus glandulosa*) generally does well on poor soils, and will grow to a good size, even on limestone, with a good rainfall. It is durable, easily worked, and from its special lustre considered adapted for cabinet-making. It generally throws out very strong suckers, a circumstance frequently rendering its culture very undesirable in some districts.

The stone pine (*Pinus pinea*) is a slow grower, producing timber of no great value, but may be worth planting on limestone country, as it generally succeeds well on dry stony sites. The pine which will, however, prove most reliable for the mallee country is the Aleppo pine (*Pinus halepensis*), to which special reference has already been made.

The upright cypress (*Cupressus sempervirens*) will grow on poor land, but only to serve the purpose of a shelter belt, its timber development being too slow to need consideration.

In conclusion, it may be mentioned as an alternative to the planting mallee land, that where the lands are not yet totally cleared the plan of leaving strips of the original scrub around the various paddocks on any estate would prove less costly, and at the same time give the double advantage of affording shelter from injurious winds to both stock of all kinds and crops, while providing a continuous supply of firewood and other material under judicious felling of a limited portion periodically. There can be no question that in some places the wholesale clearing of scrub timber has largely increased the vehement and injurious character of prevailing winds, and this highly important question leads me to offer this suggestion, as it will be at once evident that much time must necessarily elapse ere newly planted trees of any kind could, even under favorable conditions, form as good a breakwind as the existing scrub, where that is of any value at all.

## WASHING AWAY OF LAND AND METHODS OF PREVENTION.

By THOMAS HARDY, J.P., BANKSIDE.

The washing away of the land has been going on steadily for thousands of years, but in these colonies it has been greatly accelerated since settlement of the country, owing to cultivation and to the removal of the natural growth. In all directions you will now find yawning chasms, sometimes of most formidable dimensions; where, sixty years ago, there was no sign of even a watercourse. A mere plough furrow made to drain off stagnant water has often caused the

formation of a deep and broad watercourse; dray tracks on sloping land have caused the same result. The principal cause, however, of this washing is the clearing of the hillsides of the natural growths—trees as well as grass and bushes—and the consolidation of the land by the treading of cattle and sheep.

Anyone acquainted with the land in its natural condition will have noticed how even heavy rains are arrested, first by the foliage of the trees and bushes, and then by grass, fallen leaves, twigs, &c., so that the water soaks into the soil, instead of collecting and running away. With the removal of this natural growth and the consolidation of the land, there is nothing to arrest the downward course of the water after heavy rain, consequently it collects and seeks a lower level, either through the natural depressions, or in furrows and other artificial tracks. The consequence is that much good land is rendered unfit for cultivation owing to the presence of these washes, and the greater portion of the droppings of stock and decayed leaves, instead of nourishing the soil are washed away, together with a greater or less proportion of the surface soil.

Sandy loams with red marly clay subsoils are most affected, as once the water gets a run, it acts very rapidly. Stiffer soils resist the action of water and do not usually wash to any extent. In the Aldinga Vineyard, especially on the steepish hillslopes facing south, I have had considerable trouble. The soil, being of a sandy nature, began to wash badly soon after planting. In 1885 Mr. B. Seppelt, of Seppeltsfield, who inspected these washes, told me he had been successful in preventing them by making a number of shallow drains to convey the water away. Acting on his suggestion I made a number of shallow drains with a fall of 4in. in 15ft., and about 2 chains apart, taking the water on to an unused district road, where it did so much damage that the local council instructed me to keep the water on my own land. I did so, but in two wet years the water washed out a chasm 15ft. to 16ft. deep, and wide enough to take in a good-sized house.

About this time I happened to be travelling through New South Wales, and at Mr. Walter Lamb's place, at Rooty Hill, I noticed an overflow to a dam made of galvanized iron, and saw at once that this was what I wanted. I soon had one fixed up, building a concrete wall across the watercourse on solid ground, and then letting four 8ft. sheets of 24-gauge galvanized iron (turned up about a foot at each side) into the wall, fixing it up with a little concrete, and allowing the other end to rest on a stout sapling thrown across the chasm. The water falls on to a bed of vine cuttings below, and flows away quietly beneath. This proved very successful, as the chasm has not gone back an inch or become any larger during the past ten years.

In the meantime another bad wash started, and I had to make a number of falls to get over the difficulty. I made them wholly of galvanized iron and wood (doing away with the concrete wall), using any old iron for the vertical backing and three 5ft. lengths of galvanized iron for the chute, the principal thing being to prevent the water getting through at the angle at the junction of the chute and backing. This was got over by using a strip of sheet lead about 4in. wide fitted closely to the flutes of the iron.

Some gave a little trouble owing to the water getting through at first, but with proper attention for a year or two it can be got over, and be made to answer the purpose well.

The shallow drains can be readily made, if the land is clear, with the plough and  $\vee$  scraper. Plough three or four furrows all downhill, then move the soil with scraper; plough two or three more furrows and clear out again. The  $\vee$  scraper used in the Goulbourn Valley for making irrigation channels is constructed of two pieces of heavy wood, one about 9ft. long, of 3in. by 9in. gum timber, and the other, which does the scraping, 7ft. long. They are fastened together, at any angle desired, by a strong hinge. Such drains,

which can be easily ploughed or scarified over, require the sand to be cleared out after heavy rain. They should have a fall of about 4in. in 15ft.; if more than 6in. is given washing will take place. The levelling is done by means of a handy level, made of a 15ft. flooring-board with a short leg 2in. long at one end and one 6in. long at the other. With this a man and boy can do a lot of levelling in a day.

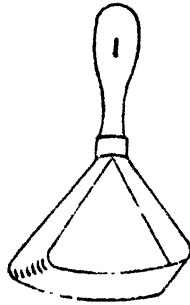
For vineyards liable to wash I can strongly recommend this method of dealing with the evil. How far it can be adapted to other cultivation is for each one to determine for himself. Personally I see difficulties in using these drains in wheat land, owing to their being in the way of the machines, but that could probably be overcome by making them wider. For permanent grass land they would retain much of the manure and soil now washed into the sea, and once made would require very little attention.

## UTILISED WASTE.

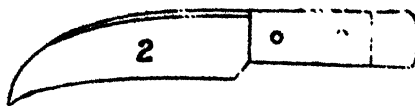
There are a few people in this world who think it is mean to utilise a worn out article, or to make savings in small matters; but they forget that they can, by so doing, afford to be more liberal in other directions. The principle of "Waste not, want not," has been recognised from the very earliest times by the wise people of the earth, and proverbs innumerable are extant, eulogising the virtues of thrift and care. "The man who has, can give; but he who has not, requires help," therefore, "a penny saved is a penny earned." Where thrift reigns comfort prevails. Such thoughts as these would easily fill several pages; but there is no need to elaborate upon this subject, because everyone who will only devote a few moments to a study of the question must realise the fact that the comforts of life, and the conveniences of the home, can be very considerably augmented if unnecessary waste of any kind is avoided. But still there are points in economical management which we are all liable to overlook, and for want of knowledge, want of thought, and want of care we miss many comforts which we ought to possess. In regard to nails, screws, ruves, washers, nuts, and similar small articles are often thrown together into a box, which becomes partly filled with dust, and when anything of the kind is wanted the whole lot has to be turned over, with the result, perhaps, that the article cannot be found although there, and the clothes and hands of the searcher are smothered with dirt. A careful, thrifty man will put up a series of shelves in a shallow wall case made of an old packing case, and use old salmon and fruit cans as receptacles for each size of screw or nail, or for his various rivets, ruves, bolts, nuts, &c., and paint upon the tins the nature of their contents. This will save space, time, patience, and trouble. A number of pegs let into the inner walls of the barn or toolhouse will sustain the rakes, hoes, spades, and other small implements, which in some places are put down anywhere, and are likely to injure the live stock, or to be injured by exposure to weather. The twine that has once served to bind sheaves of wheat or hay is now often used for making rough ropes, halters, mats, &c. Gates of various patterns and sizes are made of hoop iron taken from wool bales, and the odd ends of fencing and other wires are used in many ways by ingenious farmers. At recent shows held by Branches of the Agricultural Bureau of South Australia—notably at Penola, and at the combined North Yorke's Peninsula show, held at Port Broughton—a very large number of exhibits of utilised waste substances were entered for competition for small prizes. These exhibits were in every case very creditable to the ingenuity of the exhibitors, well executed, and remarkably useful. Barrows, trucks, tanks on wheels, and other labor-saving contrivances can be made with the aid of wheels from old ploughs, &c., and portions of



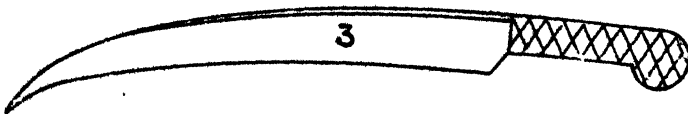
worn-out implements and tools; and many useful tools and contrivances can be obtained from old reaphooks and scythes. Handsaws and crosscut saws furnish steel blades for hoes and similar cultivating implements, which are preferred by some practical gardeners to such a degree that they remove the blade from a new hoe in order to substitute one of their own made from an old crosscut saw. The blade of the push hoe is sometimes set diagonally, and sharpened to a chisel edge on back, front, and ends, so that it can be used any way for cutting weeds or working the soil loose. The illustration marked 1 shows how a piece of an old handsaw can be made into a device for scraping the hair off a slaughtered hog. It is cut into shape, after softening in the fire, by aid of a cold chisel; then bent to proper form for setting in the handle, put back into the fire until red hot, and next thrown into cold water or into grease. If at once removed and watched the blue color will develop, and when it is considered to be of the right hardness it can be cooled down at once by throwing back into the cold water. The handle may be made from a round piece of wood. The hole for the stem of the scraper should be bored, the ring or ferrule placed in position but not driven on, then insert the steel scraper and drive down the ferrule. This will make a tight fastening.



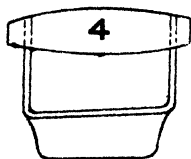
The next article (No. 2) is a handy knife, which may be used for cutting up potatoes for planting, to remove the tops of turnips or mangolds, or for any other purpose. This can be made from an old scythe, by leaving 4in. or 5in. of the point for a blade, the same length for the handle: remove the back altogether; make two rivet holes for the handle, which may best be made with two strips of hard wood, such as sheoak or gum. The following illustration will show how this can be done:—



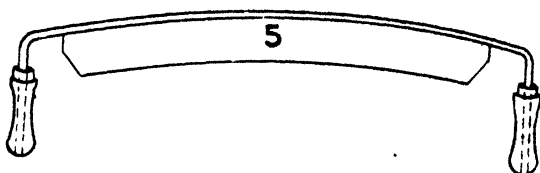
A slashing knife for cutting hedges, or for many other purposes, can be made from 20in. of the point of an old scythe. About 5in. of the blade can be partly removed, and a wooden handle riveted on, as in the former case, or the part can be wound tightly with binder twine until stout enough, and then bound over with leather. A handy bread knife may be made in the same way with a shorter piece by removing the back.



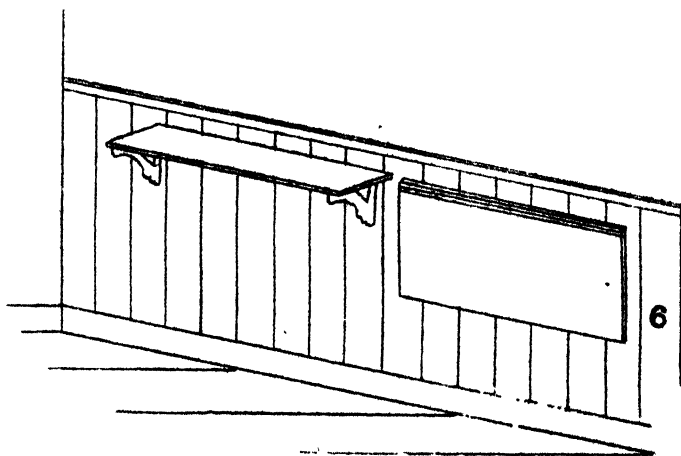
No. 4 is a useful tool for chopping up suet, meat, apples, &c. The blade should be 5in. long, and the rest removed on each side for about 5in. The back rib should be heated in the fire, and turned up at a right angle to be fixed in the handle, as shown below.



Another useful article is a draw-knife for rough shaping handles, spokes, &c., of wood. The figure explains itself. The tool can be made from an old scythe, 12in. for the blade and 6in. at each end for the handles. To fix it in the wooden handles, bore the holes first, place the rings or ferrules loosely in place, drive the iron down into proper position, and lastly drive on the ferrules.

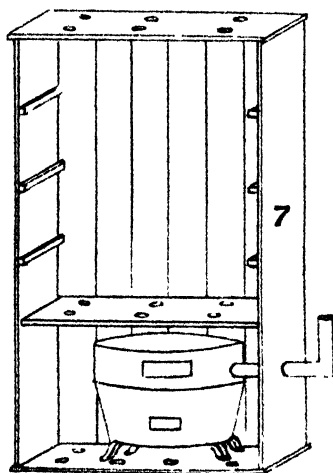


In some country houses the rooms are none too large, but space may be economised by affixing flap-tables to the walls—preferably under a window. When not in use the brackets beneath can be turned round, and the table lies flat against the wall. The ingenious farmer will readily devise a means for affixing the table to the wall in case his house is constructed of stone or brick. In the illustration the house seems to be of weatherboards.



A supply of fresh fruit and vegetables all the year round is considered to be impossible in some parts of our dry North, but this can be secured in part by use of an evaporator. A very cheap machine can be made from one or two

old packing cases, which the local storekeeper will be glad to get rid of at next to zero prices. The doors are omitted in the drawing, so as to show the interior construction:—



The principle is to supply heat to the upper portion, where the fruit is placed on wire trays; but by all means keep out the smoke. The stove may be of any form or shape, and the smoke must be carried out at the side or back. The board placed over the stove is to prevent too strong heat striking the bottom trays. The vegetables or fruit should be very thinly spread on the trays, and ought to be shifted upwards every twenty minutes, placing a fresh tray each time on the bottom shelf. If the articles on the top shelf are not dry enough, give the tray another turn at the bottom. Do not dry anything too much—when no moisture will press out it is quite dry enough. The fruit or vegetable should still be quite soft and barely elastic when pressed between the thumb and finger.

Hints, with designs or drawings, showing how to utilise waste substances will be acceptable, and, where advisable or possible, will be published from time to time. Address—Editor, *Journal of Agriculture and Industry*.

## HOUSEHOLD PARLIAMENTS.

**GENERAL BUSINESS.**—"Ways and Means" were again considered by a very full "House" at Millicent, on January 8, and several seasonable matters were brought before the "Grange" and discussed by the members.

**BUTTER DURING HOT WEATHER.**—How to make butter when the weather is hot was closely dealt with, and the following recommendations were brought forward:—Add salt and saltpetre to the cream. [Quantity per quart not stated, but great care must be taken not to add too much.—EDITOR.] Place the butter in salt water over night to extract the buttermilk. Scald the milk in a vessel other than that in which it is to be set for creaming. Place the milk in deep cans, and cool it in the well. Use deep dishes or cans, such as kerosene cans opened the high way, for setting milk. Cool the milk as soon as possible. Use one of the best preservatives. [Don't.—EDITOR.]

**PRESERVING FRESH MILK.**—It was mentioned that a member had preserved milk in bottles in the same way that fresh fruit is preserved, by leaving a few minutes in the boiler after the corks are put in.

**RECIPES.**—The following tested recipes were given by various members, whose initials are appended to each:—

**GINGER BEER.**—Ingredients: 2½lbs. loaf sugar, 1½ozs. of bruised ginger, 1oz. cream of tartar, the rind and juice of two lemons, 3galls. boiling water, and two large tablespoonfuls of thick, fresh yeast. Mode: Peel the lemons, squeeze the juice, strain it, and put the peel and juice into a large earthen pan with the bruised ginger, cream of tartar, and loaf sugar. Pour over these ingredients 3galls. of boiling water and let it stand until just warm; then add the yeast, which should be thick and perfectly fresh. Stir the contents of the pan well and let them remain near the fire all night, covering the pan with a cloth. The next day skim off the yeast, and pour the liquor carefully into another vessel, leaving the sediment. Bottle quickly, and tie the corks down, and in three days the ginger beer will be fit for use. For some tastes, the above proportion of sugar may be found rather too large, and it may be diminished, but the beer will not keep so long good.—S. H.

**HOP BEER.**—Boil 2lbs. each brown and white sugar with 2ozs. of hops, 2ozs. bruised ginger, and a handful of bran, in 2galls. of water. Add 3galls. of water, and when cool a cup of good yeast. Work and bottle.—R. C.

**HOP BEER.**—Three gallons of water, 4lbs. sugar, ½lb. hops, 2ozs. bruised ginger, three or four eggshells, two handfuls of wheat. Tie in a large muslin bag all the ingredients except the sugar, boil for an hour and a half. When cool bottle and put a raisin to each bottle. The raisins will act like yeast, but are very much quicker.—A. S.

**CHILI BEER.**—Boil for twenty minutes twenty chillies in a gallon of water, then put in a separate vessel 2lbs. sugar, 3ozs. cream of tartar, and pour the boiling chillies on them; stir till the sugar is thoroughly dissolved, and add six quarts of cold water and two tablespoonfuls of yeast. Before putting chillies in tie them in a muslin bag so that it needs no straining.—A. S.

**ORANGE JELLY.**—Four large oranges, juice of all and grated peel of one, juice and half the grated peel of one lemon, one packet of gelatine soaked in a cup of cold water, the whites of four eggs whipped to a stiff froth, one large cup of white sugar, one pint of boiling water. Mix the juice and peel of the fruit with the soaked gelatine and sugar, stir all together and leave for an hour, then pour on the boiling water and stir until clear. Strain through a coarse cloth, pressing it hard. When quite cold whip in the whites, put into a wet mould. By whipping it altogether for ten minutes it turns into orange snow.—F. M. H.

**TABLE JELLY.**—To 1oz. of gelatine soaked in a cup of cold water for three hours add one cup of sugar, one cup of boiling water, stir for a minute or so, then add one cup of wine and a teaspoonful of citric acid; stir again, then strain through muslin into a wet mould.—F. M. H.

## HOUSEHOLD HINTS.

**CANNED GREENGAGES.**—A lady at Meadows writes that she has been eminently successful in preserving greengages by the following method (which is the one generally recommended):—Procure 4-lb. cans with lever lids. Fill them completely with freshly-picked fruit, not too ripe; put into each as much cold water as they will hold; put the lids tightly on; place the filled tins in a copper over the fire; pour water in the copper till the tins are nearly covered; bring the water to a boil, then at once lift the cans out, but do not loosen the lids; set them on a cool floor, and run some melted beeswax around the lids. Next morning stow them in a cool place, when probably the tins will bulge inwards a little. This is proof that the fruit is safe for at least a year. When opened, the water inside will be found to be a thick, rich, delicious syrup.

**TO CRYSTALLISE PEACHES.**—Take the yellow cling, pare and cut them in half to free them from the stones. To 5lbs. of fruit allow 2lbs. of sifted sugar for the sprinkling. Make a syrup of ½lb. of sugar and a little water; when it becomes hot put in the peaches. Let them remain cooking until quite clear, but not to get red. Take them carefully out, spread them on a broad dish, and set them in the sun to dry. A light mosquito netting will keep off the insects. Strew some of the fine sugar over them, not too much at a time, as it would draw out the syrup too fast. If syrup does not form you must remove the

peaches to a dry dish. When they begin to look dry stew some more, and when they have become quite dry place them in jars, with a layer of sugar between two layers of fruit.

**TOMATO HONEY.**—Boil 1lb. sliced yellow tomatoes and one grated lemon with peel together until quite soft, and squeeze through a jelly-bag. If heated very slowly at first, until the juice begins to run from the tomatoes, it will not be necessary to add any water. Then to 1lb. of juice add 1lb. of sugar and the juice of one lemon. Boil until as thick as jelly, put into glasses, and cover with paper.

**BUGS.**—In wooden houses it is sometimes nearly impossible to exterminate these horrible insects. The very best remedy is to make a lot of thin paste, and seive the whole walls and ceilings with a coating, the same as if lime-washing. When dry give another coating, and then limewash may be used. The paste destroys the eggs, larvæ, and full-grown insects.

## IMPACTION OF THE OMASUM AND ASTHENIC APOPLEXY IN CATTLE.

By R. J. NEEDHAM, DEPUTY CHIEF INSPECTOR OF STOCK.

Very many losses have been experienced by cattle owners, and more particularly by owners of milch cows, from the above causes, and I am afraid these losses are yearly increasing. These affections are so often found concurrently in the same animal, and one is so often the outcome of the other, that it seems unnecessary to separate them in describing the symptoms.

It may be as well here to give some of the names by which these diseases are known in Great Britain:—"Vertigo," "staggers," "fardel-bound," "clue-bound," "peek-bound," "swimming in the head," &c. The symptoms are not always alike, but are generally attended with weariness and dullness of the whole frame, head and ears often hang, and there is a stiff, staggering gait. Obstinate constipation is generally present. As the disease proceeds, and apoplexy commences, the eyes stare and become bloodshot; the animal constantly lies down, and is made to get up with difficulty, and will only remain standing a short time; the pulse at first, full, as the brain becomes oppressed, is small and gradually becomes weak; temperature 102° to 103°; occasionally delirium sets in, and the animal becomes violent, running about and charging whatever comes near it. The treatment of these diseases is very unsatisfactory. When the animal has impaction only, a dose such as the following often effects a cure:—

Epsom salts .....	1lb. or 2lbs.
Gentian and ginger, of each .....	2oz.
Calomel .....	2 drms.

Mix with 1lb. or 2lbs. of treacle and two quarts of warm ale or porter.

The purgative draught is not to be repeated. Bleeding is not advisable for this disease, but stimulants have been tried with good effect in rousing the stomach, often loaded with bushels of food—

Liquor of ammonia .....	1oz.
Warm ale .....	1qrt.
Essence of ginger .....	4oz.

To be given every few hours.

When asthenic apoplexy sets in, and the animal lies about and appears sleepy and unwilling to rise, and when roused up walks with an uncertain, stiff, and dragging gait, and when left lies down again, medicine is of no avail.

The *post mortem* appearances, where there is impaction of the omasum, are very marked. The contents of the third stomach or bible, are dry and hard,

often appear as if they had been baked, and will crumble into dust between the fingers, and the leaves of the organ become apparently rotten and break away at the lightest touch. The small intestines are often blood-stained and reddened in patches; the large bladder is generally found empty and the gall bladder very full and the fluid much darker than usual. The rumen is generally very full, the lungs and liver more or less congested. The *post mortem* appearances of asthenic apoplexy show the brain loaded with blood.

I cannot here do better than to quote shortly from a report furnished to the Chief Inspector of Stock of this colony by Mr. Alfred Bickford, Government Veterinary Surgeon, who, speaking of two *post mortem* examinations which he made on cows suffering from asthenic apoplexy, says:—"My attention was first drawn to a three-year old heifer that had been ailing since the 2nd of January (17 days). She was lying down, her temperature 102° and her pulse 80. She looked dull, stupid, and much out of condition. She was slaughtered, and I examined her belly and chest without finding any disease, but on exposing and examining her brain I at once found a most unusual appearance: at its base there was a layer of blood that had escaped from the blood vessels." On examining a second cow at the same place, he says:—"This cow had a sleek coat, and she was also in good store condition, but she preferred to lie, and could not be made to stand up for many minutes: she occasionally chewed the cud, and also ate some bran and chaff daily. The appearance of the two brains was almost identical, and I no longer hesitated to form an opinion as to the true nature of the disease, which is asthenic apoplexy of the brain, or in more homely phrase, starvation apoplexy of the brain," and he goes on to say that—"If cattle are to be kept on a limited acreage they must have food provided at certain periods besides what the land provides in the shape of grass and bushes."

The owners of cows must alter their hand if dairying is to be made a success in many parts of this colony. Good, wholesome, nutritious food must be provided for the cows during the hard time of the year. In many of our farming districts there appears to be a want of phosphates and other principles in the soil, exhausted probably by the constant cropping, and the want of these principles in the feed will account to a great extent, no doubt, for the great mortality amongst the farmers' cattle.

As a preventive the best possible food must be provided and fed to the cattle during the bad time of year. Sulphate of iron and salt should be given, either in the food or as a lick. One pound of sulphate of iron to 10lbs. of salt mixed dry in a trough. An occasional feed of bone meal would also be of immense service.

## THE VINEYARD.

### HIGH TEMPERATURE IN WINE FERMENTATION.

*Paper read before the S.A. Vignerons' Association by A. J. Perkins,  
Government Viticulturist.*

The vintage is upon us, and winemakers are naturally anxious to anticipate its arrival by an exchange of ideas on some subject connected with the important phenomena involved in fermentation; and it is on this account, I take it, that the task of initiating in a paper a discussion on the influence of temperature on the initial stages of wine-making has been entrusted to my care. The subject is an important one, and an old one, worn well nigh threadbare on previous occasions, so that I can hold out little hope of being able to lay before you information with which you have not been previously acquainted. But however much I

may be driven over well beaten tracks matters little, if, in the discussion that will follow, information of use may be elicited from those who have now been battling for years against the evils of high temperature. Before taking up my subject matter, I may be permitted to express the hope that such may be the case.

Wherever the life and development of living organisms is concerned, the question of the temperature of the surrounding medium is of extreme importance. Under the effects of natural selection they have gradually evolved into definite types, adapted to a special and well defined form of environment; and, amongst the various factors that go to make this environment, probably the relative temperature of the medium in which they live is confined within the strictest limits. At this stage it is necessary to make a distinction. For every individual species there are certain well defined limits of temperature, which, if attained, determine *ipso facto* extinction of life; whilst below and above these extremes lies a region of temperatures within which the species suffers, and sooner or later comes to an untimely end. Thus, if we except the spores or seed germs of some of the lower fungi, and certain algae that are found in hot springs, no living organisms can resist temperatures varying from 167° to 170° F.; for at these temperatures the albumen of which the living matter is composed becomes coagulated. In some cases similar results may be obtained at a much lower range of temperature; thus, if the medium in which the organisms are immersed contains substances of an antiseptic action, however small, they are less able to resist the action of high temperature. This is exemplified in wine, in which alcohol, acids, tannin, &c., are all slightly antiseptic, so that here temperatures varying from 130° to 140° F. are sufficient to ensure complete sterilisation. On the other hand, in liquids with an alkaline reaction, such as milk, 212° F. will not destroy all the germs present. In a similar manner extreme cold, though less effective, will, in the long run, bring about the destruction of life. Lying between these fatal limits of extreme heat and cold, we find the normal variations of temperature which characterise the natural conditions of our globe; to them are adapted in regular gradation a series of beings that thrive best at the average temperature obtaining at the locality, or in the medium, in which they may be placed. Over the great variations of temperature ranging from the Equator to the Poles we find different races of men and animals, each specially adapted to the conditions with which it is surrounded. The same may be said of the infinitely small organisms that are occupying our attention at present. Brought under the influence of temperatures below or above their normal *optima*, but not too closely approximating the fatal extremes, they do not usually succumb immediately, but their vitality is affected, and they are generally unable, in the struggle for life, to compete against better acclimatised rivals. This fact is of some importance to us, as to a certain extent affording a satisfactory explanation of the vagaries of a must under the influence of abnormal temperatures.

Passing from the general to the particular, we find that wine yeast thrives best at temperatures varying from 70° to 80° F. Within this range, provided the density of the must be not too great, it will slowly and gradually bring about the complete decomposition of all the sugar present. At 60° F. growth is still healthy, but slow; below this temperature the yeast has often to give way to other germs better adapted to such conditions, and mostly belonging to the mould tribe. Temperatures varying from 80° to 90° F. seem to drive the yeast to unusual exertions; growth is extremely rapid, and fermentation quickly becomes tumultuous. Above 90° F. fermentation still continues, but the yeast suffers, and when examined under the microscope shows signs of decrepitude. Finally, when the temperature approaches 100° F., fermentation,

as a rule, practically ceases, and the field is again thrown open to newcomers, all of which have a deleterious effect on wine. There are various germs that flourish at these relatively high temperatures, but the most important of all, at least so far as we are concerned, is the mannitic ferment, the originator of sweet acid wines.

Such, in brief, are the results that laboratory practice and cellar experience have brought to light concerning the relations of wine yeast and temperature. Let us now inquire to what extent they interest the winemaker. It may be said in a general way that the interests of the winemaker are bound up with those of the yeast; in other words, that, as a rule, those conditions that are favorable to the development of the yeast are also those that favor the production of a wine of good quality. It is an axiom in wine-making that the development in the must of any germ other than the yeast leaves deteriorating traces in the wine that results from it; it must necessarily follow, therefore, that every effort should be made to maintain the yeast in exclusive possession of the must. It is similarly known that whilst the yeast is making vigorous healthy growth it can, of itself, crowd out all other rivals; in consequence, from the initial stages of fermentation to its very end, by every means possible, active growth should be encouraged and maintained. At the same time experience has shown that slow even fermentations usually give rise to the best wines. To the best of one's abilities, therefore, violent tumultuous fermentation should be checked, as tending to mar the quality of the wine.

We may now turn our attention to those conditions against which, in his attempts at the production of a good wine, the winemaker has to wage war. And first, just a word in regard to low temperatures. Undoubtedly wines endowed to the highest degree in bouquet and aroma result from slow fermentations at relatively low temperatures. Under our conditions, however, it is not in musts that are already in full fermentation that low temperatures are dangerous; mouldy musts are only met with when fermentation hangs fire at the start. When the grapes reach the cellars at a relatively low temperature, and the weather continues cold, the yeast germs enter very slowly into active life, and meanwhile the ubiquitous mould invades the must. This difficulty is, however, readily obviated. In the first place, a few bucketfuls of must in full fermentation should be poured into every vat as soon as it is full. Should this operation remain without effect, an adequate proportion of the must may be raised from 175° to 180° F., and well mixed with the bulk, or preferably, whenever possible, steam may be forced through a copper coil reposing on the false head, until on constant stirring the whole mass attains a temperature of about 70° F.

It has been borne upon most of you with the force of conviction that the question of high temperatures cannot be so easily disposed of. It may be as well at this stage to inquire to what extent wines are injured by its action. Such an inquiry will not be out of place, as it appears to me that in this matter the disastrous consequences of sweet acidity are apt, in the minds of most winemakers, to overshadow some points of minor importance, it is true, but by no means negligible. It must be remembered that all wines that reach 100° F. do not necessarily go sweet acid, and yet in a minor degree the high temperature has an injurious effect on them. Many of the elements that contribute to the flavor and bouquet of wines are already present in the grape; some are formed in process of fermentation, others later on during the period of rest in the cellars. All are very volatile; that is to say, they are apt to become volatilised under the influence of high temperature. There is little doubt but that many of those present in a must in tumultuous fermentation, and under the influence of high temperature, are carried away by the rapidly-escaping gas. The same may be said of the alcohol, which is itself highly volatile. It will be agreed therefore



that, apart from any question of unsoundness, the winemaker has every interest in keeping down the temperatures of his musts. But of course by far the most important aspect of the question concerns the unsoundness, which usually takes the form of sweet acidity, to which wines that come under the influence of high temperature are liable. The germ inducing this disease, as has already been stated, is the mannitic ferment. It is a ferment requiring relatively high temperature for its development. When, therefore, the exhausted yeast cells give way before a temperature that hampers their growth, leaving the must sweet with unconverted sugar, the former steps in, giving rise to lactic and acetic acids, both of which render a wine undrinkable. The risk of unsoundness brings forward a reason rendering it imperative to the winemaker to keep the temperature of his musts within bounds.

A study of the probable causes inducing abnormal rises in temperature should precede any remarks having reference to methods of dealing with the difficulty. Though this question has been made the subject of careful study by several wine chemists, it does not appear to me that the root of the evil has been sufficiently well defined. It has usually been found in factors that have really very little influence in the matter. In point of fact, it must be recognised that those chemists who have looked into the subject have labored under special difficulties. Living in cool countries, they have usually had but hearsay evidence of the difficulties of hot ones; little wonder that they have not been able to give an absolutely satisfactory solution of the difficulty. Under the influence of their suggestions, sudden rise in temperature has been variously attributed to high initial temperature of the must, to high temperature in the fermenting chambers, to the size of the vats, to the density of the musts, &c., &c. No doubt, to a certain extent, all these factors contribute to the final result, but singly or conjointly they cannot be said to cause it. There are few of us who have not seen musts with low initial temperatures ultimately approaching 100° F., and conversely high initial temperature does not necessarily imply fatal extremes. Again, we all recognise the advantages of cool cellars, and yet who of us has not seen or heard of musts coming under the influence of high temperature in comparatively cool cellars? So far as the density of the must is concerned, it cannot be denied that a high percentage of sugar within a certain limit hinders the development of the yeast; but, other things being equal, can it be said that it necessarily induces high temperature? If this were the case, how would it be possible to make sound sweet wines without the aid of antiseptics or added spirit?

It is not disputed that these factors do not aggravate the difficulty, and thus in a measure contribute their mite to the evil: but they do not originate it. In order to discover what I take to be the real originating cause, it will be necessary to examine what takes place in an overheated fermenting vat. We are aware that it is the act of fermentation that gives rise to the evolution of heat; chemistry readily affords us an explanation of the phenomenon. During its decomposition into simpler compounds, the heat of combination of sugar is liberated and imparted to the must. During the course of a slow regular fermentation the losses of heat by radiation and escape of the gas at high temperature are usually sufficient to compensate the generation of heat, and to save the vats from overheating. When there is no special surrecitation of the yeast this is as true of a must very rich in sugar as of a must of comparatively low density. The final result, however, is not identical. Whilst in the latter case the must ferments out dry, in the former it remains dry sweet. Here, under normal conditions, it is not heat that checks the yeast in its work, but the large proportion of alcohol produced, which acts then as an antiseptic, not only against the yeast, but against all other germs present. Cool, well

ventilated cellars are not absolutely necessary to the obtention of such results, though in a limited degree they contribute towards them, and are therefore desirable, though not absolutely necessary. The same may be said of the use of small vats as opposed to large ones.

The above is the description of a good fermentation, but suddenly, without any apparent reason, more markedly in large vats than small ones, and independently of the initial temperature of the must, fermentation becomes violent and tumultuous, and unless special precautions are taken the thermometer soon reaches fatal limits. What is it that really takes place? The yeast, under the stimulus of an agent, that in the sequel we will attempt to determine, seems urged on to unusual exertions; it multiplies and grows at lightning speed, and in an unusually short space of time decomposes an abnormally large quantity of sugar. For every ounce of sugar decomposed there is generated a fixed amount of heat; in cases of overheating the amount produced is too great to be evacuated by the usual sources of escape, and in consequence it accumulates in the vat. In the early stages this accumulation of heat only urges the yeast to still further exertions. This does not, however, last long; the mercury soon gravitates around 100, and if the wine is still tolerably rich in sugar it remains sweet and open to the dangers we wot of.

The accumulation of heat may thus be easily accounted for by the unusual exertions to which the yeast is driven. What is it that can exercise such a powerful influence upon it? I think that did we keep a daily record of the weather, and more particularly of barometric readings, throughout our vintages we would find that such accidents occurred when heavy, muggy weather prevailed; in other words, when our part of the world was under the influence of of a barometric depression. Laboratory experiments have shown that such a phenomenon has a distinctly stimulating influence on the growth of the yeast plant, and it is in low atmospheric pressures that I see the originating and fundamental causes of these dangerous high temperatures.

I have been obliged to go over this point somewhat in detail, because I am aware that in some respects I am gainsaying views that I may have held and given utterance to on previous occasions. It is only very careful thought and study that have induced me to modify my ideas on the subject; and as my present position appears to me sound, I only hope that I have expressed it sufficiently clearly to carry you with me.

I am afraid that I have already somewhat abused your patience; but, as I have no intention of dealing in detail with the practical treatment of the difficulty, I will not trespass very much longer on your time. Possibly it is as well that those whom years has given greater experience on the subject than myself should be allowed to deal with it at greater length.

Put in a nutshell the whole difficulty practically amounts to this: what is the cheapest way to keep our musts below 90° F.? Of course to a great extent it will depend on circumstances. What will suit one cellar may not be practicable in another; there will always be something left to individual judgment. Personally I favor the use of cool cellars, the limiting of the capacity of fermenting vats to 1,000 galls., and, accessorially, the use of some artificial means for reducing the temperature of the must whenever occasion arises. So far as I am able to judge, wherever it is possible to use them, coils through which a stream of cold water is caused to flow form the most effective and cheapest method of reducing the temperature of the must. In large cellars insufficiently supplied with water, refrigerators, no doubt, will in time come into general use.

Such, gentlemen, are my views on the subject. I trust that in the discussion that will follow we may have the benefit of the experience of those who may have had to deal with the difficulty I have referred to in my paper.

## COOLING MUSTS FOR WINE-MAKING.

Mr. E. Burney Young, under date September 15th, 1897, forwarded to the Hon. Minister of Agriculture and Education a translation from *La Science Française*, relative to cooling musts for wine-making. He is aware that some South Australian winemakers adopt the practice, but it is not general. If it is considered to be necessary in France, how much more necessary it is in the much warmer climate of this colony. Extreme temperatures give rise to a number of diseases in wine which impairs or ruins its quality. By the use of selected wine yeasts and maintenance of a uniform moderate temperature, the perfect fermentation is ensured, and the liability to injury by adverse bacteria or microbes is reduced to a minimum.

The quality of wines and their preservation does not depend merely on the composition of the grapes, but mainly upon the way fermentation has been carried on, that is to say, the transformation of sugar into alcohol under the influence of yeast. If the temperature rises above 39° or 40° C. the yeast is rendered impotent, and alcoholic fermentation arrested. The wines remain sugary and turbid, and ferment from time to time in an irregular way, causing much anxiety. The high temperature which nearly stops the activity of the beneficial ferments or yeast is very favorable to disease germs, which produce "tourne," "cassee," "maunitic fermentation," &c., and the wines are greatly injured, sometimes completely spoiled. Such disasters have frequently occurred in Algeria, Tunisia, in south of France, and often in the Bordeaux and central districts.

This trouble can only be combated by preventing excessive heating of the musts, and this can be secured by a systematic refrigeration, by which means the temperature of the fermenting musts can be kept below the critical point at which the action of the yeast is impeded, and its work of converting the sugar of the grape into alcohol can be completed. The wine then rapidly becomes clear and perfect, and is irreproachable as regards quality and preservation. Messrs. Muntz & Rosseaux have constructed a refrigerator for wine musts, which consists of two series of pipes, set up side by side, each side consisting of nineteen copper pipes, each 4½ yds. long, 1½ in. diameter, and ¾ in. thick, united with each other by two bronze standards, into which their ends fit. The must enters at the top of the first part, and passes through the entire series of pipes, 82 yds. in total length. The wine enters either at the top or the lower part of the first series, runs through the communication pipe to the lower end of the second series, passes through, and issues at the top, and finds its way into the cask or vat after flowing through 165 yds. of piping. Above the two series of pipes there is a metal trough perforated with two lines of small holes corresponding with the pipes, through which water is uniformly distributed in the form of rain, regulated according to the heat of the musts. A thermometer placed at the outlet enables one to gauge the necessary degree of heat. The apparatus is furnished with wheels, and where rails are laid down it can be made to run upon those lines. The best temperature at which to begin refrigeration is about 90° F., and no inconvenience occurs when it is reduced to 64° F.; fermentation progresses regularly, and the wines attain the maximum proportion of alcohol corresponding to the proportion of saccharin in the must.

**STORING APPLES.**—If it is desired to keep apples in particularly good condition place them on trays in single layers so that no apple shall touch another; place them in a cold, dry cellar, well ventilated, but without draughts. Russets and other firm apples keep well when covered with dry chaff.

## SOME RESULTS OF WINTER IRRIGATION OF FRUIT TREES.

BY GEORGE QUINN.

The accompanying illustration represents two samples of Moor Park apricots procured from Mr. A. Quick's, Brookside Orchard, Marion.

The twig carrying the large fruits was cut from a tree which received a thoroughly good soaking by diverting the course of an adjoining creek late in last winter. The small sample was taken from a tree which received the rainfall only in winter, but had been "topped up" with small quantities of water from a windmill near by.



The nine large fruits in our drawing weighed 19ozs., of which 17½ozs. consisted of pulp and 1½ozs. stones. The eight small fruits weighed 3½ozs., from which ½oz. must be deducted as the weight of the pits.

The tree from which the small fruits were gathered has made scarcely any growth; consequently the outlook for a crop next season is very poor indeed.

These small fruits were tough and flavorless, and jam made from them contained much "netted fibre," such as may be found between the outer skin and the stone of an almond. They realised from 1s. to 2s. per bushel case. The fruits from the irrigated tree were excellently flavored, firm fleshed, and suitable for the best purposes of drying or canning. They realised from 4s. 6d. to 5s. per bushel case, and were readily disposed of at that figure.

This is by no means an isolated instance, as the adjoining orchard of Messrs. Western Bros. has been treated similarly, and the finest sample of peaches I have seen this season came from the few rows treated as above stated. There are several growers along the River Torrens regularly practising this method of making up for the deficiency of rainfall at the end of the winter, and the results are satisfactory, even though they have to pump the water a height of perhaps 30ft.; and it is certain that great numbers of orchards in this colony are so situated that at a very trifling expense an adjoining creek or watercourse could be diverted into them ere it ceases running at the end of winter, so that the subsoil may receive a thorough soaking.

I know of no deciduous fruit tree growing in fairly well-drained soil that would take injury from this course. At the same time it must be borne in mind that for many of our fruits and table grapes it is only in years of shortage in rainfall that flooding would be necessary. There can be no denying the fact that most fruits develop a better flavor and are richer in solids where they can be grown without summer irrigation, and it is only reasonable to suppose that where the subsoil has been wetted in winter and the surface cultivated in summer to prevent too rapid evaporation that the steady supply of moisture from which the roots may draw without any check must be more conducive to the general health of the tree than where supplies of moisture are applied in such a way that temporary checks at intervals to the root action are inevitable.

## BEWARE OF THE SAN JOSE SCALE.

BY DR. G. G. GROFF, PENNSYLVANIA DEPARTMENT OF AGRICULTURE.

Since 1892 I have been observing the effects of the San Jose scale upon the fruit-bearing and ornamental plants of the Atlantic coast, and desire to warn, in the most emphatic manner, all lovers of fruit and shrubbery to do their best to keep this pest from their grounds. Professor J. B. Smith, of the New Jersey experiment station, has recently informed the readers of *The Agriculturist* that this scale will probably cause no more trouble than other well-known insects. He seems to think that certain persons are guilty of starting a needless panic because of the advent of a comparatively harmless insect, and he likens it to the Colorado potato bug, which, while at one time greatly feared, is now easily managed. Here are some points of difference to which the professor does not call attention.

The potato beetle is a large insect, easily seen in all stages of its development. The scale is so nearly microscopic that none except trained eyes can detect it until it has done great and possibly fatal injury. The beetle is destroyed without the use of expensive apparatus, and one or two applications of poison are usually sufficient for each crop. To destroy the scale requires expensive apparatus. No one except an expert can perform the work, and, besides, the insect reproduces its kind with such wonderful rapidity that the operation must be continued from June to November. I have repeatedly seen current bushes which bore heavy crops of fruit in July dead in September from the ravages of this insect.

The potato beetle may ruin a crop of potatoes. Other insects may destroy a

crop of fruit. The San Jose scale will not only ruin a single crop but it will kill the trees and bushes outright. This is not the universal operation of any other insect.

This insect is so minute, its attacks are so insidious, to which add the impossibility of exterminating it where once established, that at present it almost threatens to drive all fruit growing from the farm, and to place it in the hands of specialists. I believe that unless natural enemies arise the orchards and isolated fruit trees of the average farmer are doomed to destruction by the San Jose scale.

The assuring words of Professor Smith come at a critical time. There are numbers of people busily engaged in selling trees who do not believe that the San Jose scale is more harmful than other common scales. I have talked with, written to, and begged such persons to destroy infected trees, but the work of selling goes right on, and for a few dollars saved to the grower of trees thousands of dollars will be lost by innocent purchasers, to say nothing of the exasperation and destruction of bright hopes.

No nurseryman, dealer, or planter can afford to purchase any trees or plants except under a guarantee that they are free from the San Jose scale. A mere certificate will not answer. If one portion of a nursery is infested it is morally certain that the scale is distributed throughout. The "scare" is doing great good in calling the attention of both nurserymen and planters to the desirability of dealing only in clean, sound stock. Recently I saw in the same nursery in destructive numbers all the following insects:—San Jose scale, scurfy bark louse, oyster scale louse, and an unknown fungus disease. A large amount of stock had been rendered unsaleable, and yet the proprietors had not observed the condition of things. So long as present conditions exist notes of warning should be sounded.—*American Agriculturist*, November 20th, 1897.

## ORCHARD NOTES FOR FEBRUARY.

By GEORGE QUINN, INSPECTOR OF FRUIT.

Orchard work this month will be almost exclusively confined to the gathering of various crops, and the disposal of such by marketing in the fresh state or by preserving by means of canning, drying, or jam-making.

It is very gratifying to those who have advocated so strenuously for some years better methods of marketing to find that this season careful practices are on the increase. At the earlier part of the season hundreds and hundreds of cases of cherries were filled by the growers into punnets supplied by the merchants, and these punnets were packed in special cases and forwarded to other colonies, chiefly West Australia. In the city fruit auction rooms—that during past years have been with justice dubbed the receptacles for fruit unsaleable elsewhere—peaches, nectarines, and apricots may be seen in paper-lined shallow trays holding one or two layers, each fruit of which is wrapped in a fresh vine leaf, the grades being even and the bloom in many instances unsullied.

These methods have not been adopted suddenly; therefore it may be safely assumed that their increasing usage is due alone to enhanced prices paid by buyers.

It may be argued that the scarcity of fruit allows the grower time to do this; but if it can be done during a season when fruit of almost any quality commands a fair price it certainly will pay when fruit is with difficulty saleable.

There is a tendency this season on the part of growers to pick many fruits much too green. This practice cannot be too strongly condemned, as being

inimical to the best interests of the industry, in the fact that the proper flavor is not tasted by the consumer, and fruit in such a condition is highly dangerous to health.

Towards the end of this month the first fruit-carrying steamers will load freights to London. Although a fair demand will sure to exist locally for apples, not only on account of their scarcity, but owing to the shortage of other fruits, still those of our growers who have exported, and probably will continue to export in future years, should send some if they yield no more than the local prices after expenses are deducted, for the simple reason that the South Australian apples may be kept before the British public.

Many growers seem in doubt about the time to gather fruits, say apples, or rather when they are ready to harvest, and as far as I can gather from most of the leading growers here and in the other colonies, an apple or pear is ready to pluck when the pips turn brown, and when by raising the fruit gently on its stalk it (the fruit) separates readily from the spur, leaving the strig attached to the fruit.

If apples are not ready to gather they adhere firmly and the spur comes away attached to the apple strig if force be used. This of course is injurious alike to the fruit and likely to reduce the crop for the coming year.

While on the matter of fruit harvesting I cannot help referring to the differences between the consignments of colonial and Italian lemons that have passed under my notice recently. The colonial samples were uneven, coarse-skinned, dirty, covered by the remains of scale insects (killed by sulphur fumigation), and repulsive in the extreme, while on the other hand the Italian fruits were smooth (cured), bright as a new penny piece, even in size, carefully wrapped and packed in tissue paper, rarely infested by scale insects, and attractive in the extreme. There is no secret hidden in this matter; it is all covered by care and selection. Our growers can do it, and no doubt before many years will do all the Italians have done.

In the orchard ties should be loosened from around buds put in and united; any that are growing freely may be safely relieved of the ties entirely. If the sap is flowing freely—I allude to irrigated lands—buds may yet be safely inserted in most fruits, but of course they will remain dormant over the winter. Bandages should be closely examined for codlin moth larvæ, and scrupulous care taken in collecting the fallen and infested fruits as often as possible.

## NOTES ON VEGETABLE-GROWING FOR FEBRUARY.

BY GEORGE QUINN.

In our notes for January a short description was given of the method usually adapted in the construction of seed beds. Our suggestions for this month in that direction are similar, and successional sowings of cabbage, cauliflower, celery, lettuce, and onion made upon the plains country. Sowings of edible podded beans, both dwarf and runner, may be made, but the former are more rapid in podding, and consequently at this late period should take precedence. Towards the end of the month, as the nights become longer and cooler, sowings should be made of peas, prickly spinach, turnips, both ordinary and swedes, carrots, and parsnips.

Care should be taken never to sow root crops, such as carrots and parsnips, on ground that has recently been manured with fresh stable manure, as it has a tendency to cause division of the roots. A bed that has produced a crop of potatoes since receiving such manure will often be found suitable.

All the above-named vegetables should be grown in rows or drills and thinned out. This method may have the disadvantage of requiring more space, but it has the advantages of permitting the weeds to be kept down and the soil to be stirred between the rows quickly and safely, which in itself combines the advantages of regulating evaporation and aeration and loosening of the soil to allow the roots to expand.

In cool shaded corners make sowings of radish, lettuce, and cress for salad purposes.

Onion seed should be collected as it ripens before the rough winds shake them out. The bulbs of onions should be harvested where not already done.

Abundant supplies of water must be given to all of the melon family, and applications of liquid manure will be highly beneficial. Fruits should be cut from all of these plants before the seeds get very hard; this is with a view to continue the setting of other fruits.

Tomatoes must be attended to closely, and owing to the excessive dryness of the subsoil should require much more water than in ordinary summers.

Fruits of these, when affected by black rot fungus or caterpillars, should not be thrown carelessly on one side, but should be gathered and burnt.

In the cool hilly districts sowings will be made of cabbage, cauliflower, celery, lettuce, peas, mustard, turnips, beans, radish, carrot, and parsnip, kohlrabi, celeriac, and spinach. Former sown crops of turnips, carrots and parsnips, will require thinning, and plantings may be made of cabbage, cauliflower, celery, celeriac, kohlrabi, lettuce, and potatoes, where abundance of water is available for irrigation purposes.

## FARM NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,  
ROSEWORTHY, SOUTH AUSTRALIA.

Farming for the time being is becalmed. At this season of the year we anticipate as much, but this year many are becalmed short of water and feed. How varied are the wishes of landholders now regarding rain! The men with vineyards, who look on at shrivelling grapes, the men with wilting summer crops, and the men whose water supply has failed, see "the heaven as iron and the earth as brass," but specially burnished, and look anxiously for rain; while the men with good dry feed or extensive stubbles, whose water is lasting out, hope for continued dry weather and look for the rains only in their season, for they have some satisfaction that the stubbles this season and the dry grasses, such as they have, offer better feed—more nutritious—than if we had had heavy rains. Sheep are doing well in fair stubbles, and are licking the flag, dried dandelion, &c., from the floor in a manner that would have been impossible after much rain, when the stubbles and dry grasses break up more easily, are blown away, or washed away, and bulk for bulk, have much less fodder value. On the College farm, since the erection of a windmill over the renovated well, we have abundance of very fair stock water for our needs. The sheep are doing well on barley stubble; the cattle are keeping condition on silage—indeed, as the silage is rather sweet, they are going to condition rather than milk—and the horses (nearly all of necessity idle) are doing well enough ranging wheat stubbles and being fed on chaff and eavings from the thrasher.

The work now occupying us, apart from the annual examinations, is such as was indicated in last month's notes, and it will be continued for the next



month, or until rain comes, when we will get to work on fallows with all the horsepower we can command. Of course the exigencies of different farms are as varied as the farms are many, and many men who have been harvesting potatoes, or have succeeded with other summer crops, have their attention occupied fully with active operations. For example, I know a farmer who is at the present time perplexed as to the best use to make of a crop of sorghum which he has growing luxuriantly over an extensive area. He is fortunate enough to have more than his own stock can consume on the land, and is exercised as to the most profitable mode of using the excess. It is ever thus!

He that has just enough can soundly sleep,  
The o'ercome only fashos fouk to keep.

There may be others in the same position, though I don't think many will be, and it may not be out of place here to consider the modes which occur to me as suitable for using the burden of the crops. I will say in the first place that there is much justification in favor of consuming the crop on the land. The labor of cutting and carting is avoided, and very little indeed is lost by direct grazing. The soil is much less exhausted than if the crop were cut and carted off; indeed, the great proportion of the manurial constituents are returned to the soil in the droppings of the animals; and although part of the value of the manure will be lost no doubt by volatilisation and surface leaching when rains come, yet much will be left for the succeeding wheat crop. Store cattle may probably be had at a figure which would leave a good return when fattened and sold again. Cattle fatten better on sorghum than sheep, as they take to it more readily, and I know at least one leading farmer in the same district who did well by such dealing in a past year. Stock might, on the other hand, be taken in at so much per head per week—often a profitable way of utilising excess of forage—though I should prefer to purchase cattle, and if cattle were not to be had at a suitable figure, then crossbred or Lincoln sheep.

To make the excess into silage is another way of disposing of the crop for the time being. Sorghum makes excellent silage, but it requires for best results, I think, to be chaffed into a pit. In the particular case referred to, the gentleman has no silage pits, and is reluctant to go to the expense of excavating such. Unless he intends taking up dairying extensively, I do not see that it is to be recommended. But someone may suggest that the sorghum may be made into silage very cheaply by simply excavating a shallow depression with a scoop, and having the green stuff cut, carted, and dumped therein, treading it well by driving over it, until the heap is too high above ground to drive over, adding to its height thereafter by forking from the wagon, then cutting the ends at right angles to the length of the heap, and throwing what is so cut off on the top; then covering the whole with straw, and blinding the straw with soil, and finishing the job by loading the stack or dump with logs, or stones, or posts, or whatever may be available. Well, that certainly seems easily enough and cheaply enough to be done, but it is misleading, I fear, though I will say I have never personally tried the practice. There is likely, I fear, to be very considerable loss, and fodder is not to be lost this season if it can possibly be saved, and, after every care, I would have a suspicion that the whole might be lost. Whatever is worth doing is worth doing well, and I would recommend this adage especially to an operation so difficult as the making of first-class silage. I understand it has been successfully made into silage in this manner, but men are apt "to mark when they hit, but never when they fail," and I would not in this case care to take the risk.

As an alternative to cutting and ensiling the crop there is the practicability of cutting, stooking, drying, and stacking it. I believe this method to be preferable to making silage in the crude manner detailed above, but less profitable than chaffing the crop right away into silos were they available. In cutting and

stacking the crop there is considerable labor and expense involved, for (1) it is difficult to cut and gather—a strong mowing machine will cut it; (2) it is difficult to handle. (Tying the crop in sheaves is a slow process, working it loose is also slow, as the stems do not hang together on the fork, like straw or hay, and I question whether it could be cut and bound by a binder. To work it loose is probably the best plan); (3) it is difficult to dry, and a fall of rain while it is being dried injures the forage excessively, as it becomes so very readily mouldy. If, however, it can be secured in good order, and carefully stacked, it makes a capital winter fodder for cattle and pigs, and may also be chaffed to horses with fair results. My experience with it leads me to think that, in the case of horses lightly worked, it may be fed readily, and will put a nice coat on the animals; but for the wear and tear of farm work I would not recommend it to be largely used. Horses decidedly prefer hay chaff to sorghum chaff, and the latter cannot readily be made to eke out the former, as horses fed chiefly on hay are apt to leave the little of the other that may be added.

## POULTRY.

BY D. F. LAURIE.

[NOTE.—Will correspondents seeking information kindly enclose stamped envelope for reply. The old Scotch saying, "Mony a mickle maks a muckle," has a peculiar significance in reference to people seeking information in which they alone are personally and directly interested.]

### Hints.

The farmer who attends to his poultry and gives them proper food, housing, and attention will make a profit. Observant writers have stated their ability to gauge a man's character by the attention given to minor details on the farm. Without asserting that the whole end of man is to become a successful poultry-raiser, I simply wish to point out that given good stock, houses, locality, and food, the scrupulous attention to details usually advocated by experts is the keynote to success. Many a poultry breeder has come to grief by his careless and halfway manner of feeding his birds. Economy in preparation and distribution of the food is a matter that deserves the most earnest attention of poultry-keepers. I have long advocated the use of wooden troughs for the various foods, and further experience, gained not only with my own birds, but from what I see, only tends to strengthen my former convictions. "Scatter your food," says a certain authority. Just so, that is, if you have clean ground on which to scatter it. It stands to reason that if your ground is saturated with the excreta of the occupants, all food thrown thereon will have more or less actual poison adhering to it, which, when consumed by the birds, can only have one ending. Much might be said as to the callousness of human beings in regard to sanitation. There is a very great amount of disease and consequent mortality among poultry this season; much of this might be averted. Some small children I know had seventy odd chickens from me, and the only deaths from the day they left the incubator were caused by cats and dogs. The young ones were not particularly expert; they simply gave sound food, house scraps and grain, and kept all drinking water, which was renewed twice a day, well shaded, and provided green food of some description. The poultry interest is growing; I have had the pleasure of meeting several new hands lately. Readers of the *Journal of Agriculture*, but enthusiasm is of little avail unless strict attention to detail is given. Americans are a go-ahead people; it is certainly a treat to read their poultry papers, to see the attention they give to details, the secret of success.

Roup in turkeys is a common ailment, and the following extract from a letter written by a "Farmer's Daughter" in *Country Gentleman* may be of interest. "When first noticed treat as you would for a heavy cold, giving first a purgative, then a five grain capsule of quinine and Dover's powder. An adult fowl can take as large a dose of medicine as a person can without danger. All diseased fowls should be kept in a dry and temperately warm apartment away from the flock. Encourage them to eat wholesome, nutritious food, and if unable to swallow, force a little down the throat. There is nothing better for them than flour bread moistened in a rich sweet milk, adding a little pure lard. When a fowl is indisposed it generally refuses to eat, and often by a little feeding once or twice a day (not stuffing it, by any means) we may keep up its strength until the disease is cured. As long as there is any sign of roup among the flock all the water should be disinfected. Permanganate of potash, just enough to give the water a slight pinkish color, is both harmless and tasteless, and is said to destroy the germs of all diseases. Others prefer pure carbolic acid, say five or six drops to a gallon of water. And when from any cause our poultry appear out of condition, the judicious use of Douglas mixture, given as a tonic, is excellent." In place of the Douglas mixture use the following:—Dissolve 2ozs. of sulphate of iron (copperas) in a pint of boiling water, and of this add one or two tablespoonfuls to each quart of drinking water. A more modern pill than the quinine and Dover's powder is as follows, it is known as Vale's pill:—Hydrastin, 2grs.; sulphate of iron (dried), 3grs.; sulphate of copper, 3grs.; powdered cayenne, 12grs.; oil of copaiba, 24 drops; Venetian turpentine and powdered magnesia, of each sufficient to make twenty-four pills. Dose, one twice a day for fowls; thrice a day for turkeys. In cases of looseness of the bowels give half a teaspoonful of Sanitas in a dessertspoonful of water occasionally; a little may be put in the drinking water during the summer. For disinfecting, and as a cure for ticks, lice, warts, &c., in poultry; mange, eczema, ringworm, &c., in dogs, or for any skin disease, I find Whalley's disinfecting fluid very excellent. It is cheap, and can be obtained from Mr. E. Malpas, Sun Fire Insurance Office, King William-street, Adelaide: it is the best by a long way that I have used, and deserves to be well known. Those who intend to improve the quality of their stock should lose no time now in coming to a decision. I shall be glad to reply, giving any assistance, if attention is paid to the headnote of this article. The scarcity of poultry and the big prices realised this season should be an incentive to people to go and do likewise. Remember, however, that there are not a great many good stock birds available.

## THE DAIRY.

Director Johnson, at New York Experiment Station, U.S.A., selected a good Jersey cow, fed her for a fair time to put her in condition for a proper test, then fed her for sixty days with prepared foods that contained practically no fat. Everything she consumed was weighed and analysed, also the milk and all solid and liquid excrements. The figures show that she gave in her milk, 40lbs. more fat than she consumed, while she added 30lbs. to her weight, and was in a good, thrifty, fleshy condition at the close. This indicates that the vital force of the cow has the ability to convert sugar and starch in the food into fat. If this proves to be correct upon further tests it is possible that the percentage of solids in milk may be increased accordingly as food may be varied.

An ingenious contrivance has been invented in America for allotting and delivering skim milk to suppliers at creameries. Each person is presented

with a brass check representing the number of pounds of skimmed milk to which he is entitled. These checks differ in make, and when dropped into a slot the milk pump will deliver exactly the number of pounds of skimmed milk represented by the check. The various creameries are adopting the Barber & Coleman check pump, and quarrels amongst the milk suppliers are rare where it is used.

The *Dairy* publishes the following table as being worthy of preservation for reference:—Boiling point for water, 212° F.; water for scalding should not be lower than 150°; water for washing up, 110°; churning heat for summer, 56° to 60°, in winter 58° to 66°; for whole milk, 66° to 68°; temperature for setting milk, 96° to 98°; for separating, 86° to 90°; temperature of water for heating cream, 120°; temperature of dairy, 60°.

## WEATHER AND CROP REPORTS.

**AXFORD.**—The weather has been very hot, with occasional cool changes. Harvest work is finished, and farmers are now busy preparing the land for seeding. Rainfall for the year 1897, 7·850in.

**ARTHURTON.**—The weather continues very dry, and many farmers have to cart water. Stock are in good condition, but on account of scarcity of water farmers are selling. The harvest is finished, the average being about 3bush. per acre. Drilled crops were fairly good, but the majority of the unmanured were almost failures. There has been no rain since early in November.

**BORDERTOWN.**—The weather has been very hot and dry, and in the early part of the month it was nearly impossible to do any work in the middle of the day. Generally the crops have turned out very fairly considering the season. Wheat average, about 7bush.; oats, 9bush.; hay, 15 wts. Water is very scarce, almost all having to depend upon the wells.

**BOWHILL.**—Reaping is now finished, 4bush. being about the average for the district. The sample, through not maturing properly, is slightly pinched, and does not weigh so heavy as last season's wheat. The price offered here now is 3s. 11d. The bulk of the harvest has been sold at 4s. 1d. It is pleasant to notice that farmers are taking steps to conserve their cocky chaff and straw in large quantities—one fulfilment of the lesson of the drought.

**CALCA.**—Reaping is now finished; the average being about 3½bush. Unfavorable weather for harvesting was experienced. The straw is very rotten.

**CHERRY GARDENS.**—The weather continues very hot and dry. Vegetables and fruit trees are suffering severely, and springs which have never been known to run dry are rapidly giving out.

**CRYSTAL BROOK.**—The weather has been very hot and dry, the wheat being a little pinched in consequence. The average for the district is about 4bush.; hay, half a ton. The gardens generally have suffered severely. Rainfall for last quarter, 0·600in.; for year, 16·905in.

**GAWLER RIVER.**—There has been no change in the weather, and feed is getting scarce. Harvest is over, the yield being small. Stock are in fair condition, but the milk supply is rapidly diminishing. Rainfall for year, 13·050in.

**GUMERACHA.**—Light rain has fallen, but not sufficient to do any good to the potato and fodder crops. Harvest is about finished, the average being—hay, about 35cwts.; wheat, 15bush.; oats, 20bush.; peas, 8bush. Milk is falling off in quantity, and water is getting very low. The orchards have suffered very severely from strong winds.

**LUCINDALE.**—The past month has been absolutely rainless, with exceptionally long spells of severe heat. The hay crops have turned out very well, but the drought and grubs have about finished the onion and potato crops. Sheepowners are now busy dipping their sheep.

**MEADOWS.**—Owing to the heat and the ravages of caterpillars and grasshoppers the fodder crops are a complete failure. The fruit harvest is very poor. In spite of the dryness some pea crops are averaging over 20bush. per acre. No rain since last report. Stock are looking well.

**MOUNT COMPASS.**—Hot, dry weather still continues, the potato crop suffering severely in consequence. A good fall of rain is badly needed.

**PORT ELLIOT.**—The weather continues dry, and fruit and vegetables are scarce and poor. Wells and tanks are low, and springs that for forty years have been deemed to be permanent have given out. The caterpillars seem to have gone, but the grasshoppers have taken their place, and are doing great damage. They even destroy the young growth at the tops of the fruit trees. Turkey-raising should be both profitable and economic.

**RIVERTON.**—Harvesting operations are nearly over. The hay crop has been good all round, and the wheat fairly good considering the season. Bunt has been prevalent in the crops. No rain has fallen for eight weeks, causing anxiety owing to lowness of dams and tanks.

**SADDLEWORTH.**—The harvest in this the upper portion of the Gilbert Valley has been fairly good, the wheat yielding better on the "black" land, due probably to its fine loose surface keeping the under soil from drying so rapidly, for the same reason sorghum is doing much better this year on the black than on the red ground, the plant holding out remarkably with only 1½ in. rain in the four months since planting. Practically no rain has fallen since last report. Rainfall for 1897, 15.090 in., average (for seventeen years) 19½ in.

**LIPSON.**—The hottest and driest harvesting season on record for this district is over, the yield being very variable, some returns being as low as 2bush and others up to 15bush. From 4bush. to 8bush is the general thing. The sample is a little pinched. Since middle of October we have had no rain, the total for year being 10.398 in. Water is getting very scarce. Stock are in good condition, but the country is getting terribly bare, and unless good early rains fall there will be great loss of sheep. Rabbits and crows are a continual source of trouble, the latter even destroying unripe apples, plums, &c.

## FARM PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

January 31st, 1898

The month of January has closed without giving even a thunderstorm to commence the rainfall record for the year. The high temperature at the beginning of the month soon gave way to cooler southern breezes, but without any moisture, although during the past week the atmospheric conditions seemed to indicate a break-up of the drought.

Country trade, in districts that have experienced a good season, is healthy and active; but throughout the drier parts business is exceedingly dull and really cannot be expected to improve much until a general break-up of the drought occurs.

A disruption in the Millowners' Association for a few weeks caused values of wheat and flour to oscillate, during which time the many bakers fixed up contracts for future delivery. Millers, however, mostly covered their forward sales by securing supplies of wheat, so that there is but little now offering. Bran and pollard steadily eased until a week ago, when heavy demand—result, no doubt, of the continued dry weather—brought about a slight reaction, and values have recovered about 1d. per bushel. In forage lines trade is at moment somewhat flat, hay and chaff being sold at rather lower rates than those at which contracts were arranged a couple of months ago.

The crops of potatoes on the plains near Adelaide, digging very light, has opened up earlier demand than usual for Mount Gambiers. These also are suffering from the effects of the dry weather, but a good soaking run would very considerably alter the aspect of the situation, as the late crop—the heavier one in the South-East—would well respond to a downpour even now. Onions are a drug, although hardly the result of the increased area planted, but rather the difficulty experienced in keeping the early samples, so that recovery in value of this line may be looked for.

Soon after business resumed following the New Year holidays it became very apparent that butter supplies were shortening rapidly, and that not nearly enough was being made locally. Increasing quantities of cream consigned by rail from Western Victoria, and the importation of bulk butter by seaboard from Sydney to Melbourne, the former especially, where prices are relatively lower, checked the advancing tendency that was taking place: but as the price here is still much higher than intercolonial rates, we anticipate an early easing back to values approximately more nearly those prevailing in Victoria and New South Wales. The improvement in the value of eggs that we noted in last has continued under the influence of heavy Westralian demand, so that this line is very high for time of year, but with every prospect of good prices continuing. Honey has been selling very readily. Heavy month's consumption of cheese. Bacon a little more plentiful. Almonds in better demand, but prices abnormally low. The poultry market has been somewhat erratic, and at the moment fowls are selling cheaper than for twelve months past. As there is a good demand, however, for a surplus to the West, this line will probably recover.

Ruling values to-day are:—Factory and creamery fresh butter, in prints, 1s. 3½d. to 1s. 5½d.; private separator and good dairy lines, 1s. 1½d. to 1s. 4½d.; well-graded store boxes and medium dairies, 10½d. to 1s. 0½d.; pastry to mixed lots, 7½d. to 8½d. Hen eggs, 1s. duck, 1s. 1d. Honey, 3½d. for best new season's; beeswax, 1s. 1d. Factory cured sides of bacon, 9d. to 9½d.; farm hitches, 8d. to 9d.; hams, 9d. to 11d. Cheese, best quality, 7½d. to 8½d.; medium, 7d. to 7½d. Almond kernels, 6d.; soft shells, 2½d. to 3d. Poultry—Fowls, from 9d. to 1s. 5d.; ducks, 1s. 4d. to 2s.; pigeons, 4d. to 5½d.; geese, difficult to quit, at 2s. to 3s. each; turkeys, in brisk demand at 8d. to 10½d. per pound, live weight.

## CENTRAL AGRICULTURAL BUREAU.

MONDAY, JANUARY 24, 1898.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir S. Davenport, Messrs. S. Goode, W. C. Grasby, M. Holtze, H. Kelly, T. Price, C. J. Valentine, and A. Molineux (Secretary).

**Finance.**

The Finance Committee reported expenditure to date for contingencies, £514 8s. 1d.; balance, £245 11s. 11d. Accounts to the amount of £89 3s. 6d. were passed for payment. It was decided to call the attention of the Minister of Agriculture to the fact that owing to the additional expense incurred by the establishment of the *Journal of Agriculture and Industry* it would be necessary to grant additional funds beyond the provision made on the Estimates for the Bureau contingencies.

**Feeding of Dairy Cows.**

The Minister forwarded communication from Mr. Alick Murray, of Mount Crawford, in regard to the effect of rich food on the percentage of butter fat in the milk. Mr. Murray expressed the opinion that the percentage of fat may be forced by generous feeding to a limited degree, but that the limit of profit is soon reached, the yield being greater or less according to the responsive powers of each individual cow. He also called attention to the following statements in Fleischmann's "Book of the Dairy," which is regarded as one of the best works on the subject:—

In the case of richly-fed and well-tended milk cows of average age the percentage of total solids in the milk almost always increases with the advancement of the period of lactation. At the same time, not only is the percentage of fat in the milk increased, but also the percentage of fat in the dry total solids, so that the milk becomes absolutely, as well as relatively, richer in fat.

It is almost impossible to make any generally applicable remarks on the influence of food on the yield and chemical composition of milk, since this varies, and is dependent on the particular circumstances of the cows. There are cows whose milk-glands possess such great activity that even with scant feeding they give a large yield, which naturally is partly produced at the expense of their tissue; others again yield with rich feeding only small quantities of milk, but become quickly fat; while, lastly there is another class, and these are the cows which ought to be reared and kept as being best suited for dairying purposes, which yield with a continuing improvement in food a steady, unfailing increase in the yield of milk, until they reach, sooner or later, their natural limits, or a limit which is determined by the consideration of the net profits.

There can be no doubt that in the case of cows yielding a large amount of milk the fat derived from the food is utilised for the formation of milk fat. It cannot be regarded as correct that with increased percentage of the dry substance of milk all the separate constituents are raised in the same proportion. Nor is it true that the percentage compositions of solids from one animal and one lactation period is approximately constant. It is similarly incorrect to suppose that with an improvement in feeding an increase in the yield of milk is obtained which never affects one or other of the separate constituents. This at any rate does not hold good for the fat, since the percentage quantity of fat is subject from day to day and in the course of a lactation period to far greater variation than the other less variable milk constituents.

The percentage of fat in milk is without doubt most sensitive to all the external influences that affect the yield of milk. Very often it is observed that the cow, when the activity of the milk-gland is temporarily increased in the course of lactation, yields not only more milk, but a milk richer in fat, the fat being increased more than the non-fatty solids.

The most important quality in a milk cow is the capacity of the milk-glands to yield, with certain feeding, the largest possible quantity of milk, of the best possible composition. It has also been found that animals whose milk is absolutely richer in fat at the same time

yield milk relatively richer in fat. As a proof of this a few figures may be quoted, which the author selects from a number of available data:—

	Fat.	Total Solids.	Fat in Total Solids.
143 Dutch cows (Kleinhof-Tapien)....	3.226	11.913	27.08
100 German cows (Raden) .....	3.242	11.953	27.13
24 Shorthorn cows (by Dr. Vieth)....	4.518	13.948	32.39
24 Jersey cows (by Dr. Vieth) .....	4.908	14.596	33.62

It may be observed from the above figures that the milk containing an increased percentage of fat and solids is also always relatively richer in fat.

Personally he was of the opinion that a plentiful supply of nutritious food of good quality is all that will pay the dairyman or the breeder to provide, and that when forcing for extreme results commences so do such troubles as milk fever, abortion, lack of fertility, &c., and that fatty foods and oils should under no circumstances be allowed to breeding herds in a dairy in this climate.

### Donations and Exchanges.

The SECRETARY reported receipt of usual exchanges from various Agricultural Departments and institutions, and of seeds from the Canadian Department of Agriculture.

### New Fruits—Typical Orchard.

In reply to questions, Mr. Holtze stated that the strawberry plants sent out some time ago by the Agent-General, as well as a number ordered by himself, had all died. He had, however, just received, in good order, a number of plants of the newest strawberries, raspberries, currants, and other small fruits, nearly all of which he expected would grow all right. The hop plants sent out by Mr. Goode, some three years ago, did well, and were distributed to different growers for trial. The land at Mylor reserved for the proposed typical orchard had now come into the possession of the Government, and only a few details had to be settled before being placed under his control. He had a large assortment of fruit trees ready for setting out during the coming planting season.

Some discussion took place on the failure of the Smyrna fig trees in this colony to set fruit. Mr. Grasby said the experience in California and elsewhere had been that it was impossible to get this variety to fruit without the aid of the *Blastophaga*—Caprification, as it is called. It had been condemned by many scientific men, but years of experience in Smyrna and elsewhere had proved, to his mind at least, that the practice of the growers in the Mediterranean was sound.

### Milk Bush.

Mr. HOLTZE reported that the plants of milk bush (*Sarcostemma australe*) received from the West Australian Bureau of Agriculture were growing well, and cuttings could be obtained by anyone desirous of trying the plant. He would, however, advise caution in dealing with the plant, as in the Northern Territory and Queensland it was regarded as poisonous, and in Bailey and Gordon's "Plants reputed poisonous and injurious to stock" several instances are given where it has caused the death of animals.

The SECRETARY said some time ago the West Australian papers called attention to statements of a sheepowner who had kept his sheep alive and in good condition almost solely on this plant during a season of drought. He consequently wrote to the West Australian Bureau for information and for specimens, which were duly received and handed over to Mr. Holtze. In the northern parts of this colony the plant was reputed to be injurious to stock.

### Standard Sample of Wheat.

The secretary to the Chamber of Commerce forwarded standard sample of wheat, weighing 62lbs. to the bushel, as fixed by the Chamber for the season 1897-8.

### Branch Conferences and Shows.

The SECRETARY reported that the following Branch Conferences and shows of produce were to be held shortly:—South-Eastern Conference, at Bordertown on March 16; Northern Yorke Peninsula Conference, at Alford on March 23; Southern Conference, at Strathalbyn on March 31; Lower Northern Conference, at Kapunda on date to be fixed; Cherry Gardens Show, on March 17.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

184. *Experiments with Nitragin and Nitrogen gained for Heavier Soils.*—Professor Dr. Maercker, of Halle, a.s., desired to ascertain whether these soils could not gain the necessary nitrogen by intermediate crops from nitrogen-collecting plants, as had been proved in light soils, by Dr. Schultz-Lupitz, with such eminent results after crops of rye. The chief difficulty seemed that crops, especially of wheat, would not be so early removed as from light soils cropped with rye, to allow time before winter of getting a full crop. Only after early potatoes, barley, and rye could such be possible, and in 1896, after barley, nitrogen-collecting plants were sown, and one portion was vaccinated with nitragin. The barley having been mown on the 21st and 22nd July the ground was ploughed next day, and the seeds of pea-flowering plants drilled in, always alternating, one width of the machine sowing seeds *with*, and the next *without* nitragin. For the latter the seeds were covered against the sun, and mixed on a tarpaulin with the diluted nitragin immediately before putting them into the drill. The plants were mostly visible so early as the 30th day of July, and the mixtures of 100lbs of horse beans, 200lbs. of Victoria peas, and 100lbs. of vetches grew well with frequent rains, but those who had received nitragin showed only an advantage over the others after the first eight weeks. Blue lupins did not succeed, and only some plants with nitragin were normal. To ascertain the quantity of nitrogen collected, on the 5th of November a large number of average plants were dug up, with the roots to 6in under the surface, and well washed. I give here only the results of the mixture of beans, peas, and vetches. The ashes of those, which had been treated with nitragin, contained, as calculated per 2½ acres, 9,248lbs. of dry substance, against 8,042lbs. without, and about 369lbs against nearly 296lbs of nitrogen. These 369lbs. would represent a quantity of 77 22lbs. of nitrogen per morgen (something more than half an acre), or equal to what 5cwts of nitrate of soda would give to the soil. This crop was at once ploughed under as a green manure. Further experiments will be made with nitragin, as the results, although respectable, were not as good as might have been expected with really good samples. Oats were now sown on the land, and the whole countryside was surprised at the crop (which was not quite ready on the 12th of July, 1897), the more so, as compared with a crop of oats alongside, where the land had received 8cwts of nitrate of soda and 6cwts. of Thomas phosphate per 2½ acres. This showed that the green manuring with the pea-flowering plants, and their deep-going roots, gives a chance of drawing moisture from below in the dry weather, which had set in. Prof. Maercker is not quite so certain as many others that only in a moist year success will follow such an intermediate crop. For our climate in the North only the results from the use of nitragin, and the sowing of pea-flowering plants and their use for green manuring, are of value; but in the hills, and in the South-East, in many seasons, with early rains, such an intermediate crop might perhaps be raised after wheat and early potatoes, and ploughed under in winter.

185. *Phosphoric Acid and Potash in Manures.*—At the large meetings held during the Horticultural Exhibition at Hamburg Professor Dr. Wagner, of Darmstadt, said that all conditions should be taken into account to ascertain whether Thomas meal or superphosphate should be used. One pound of the citrate-soluble phosphoric acid in Thomas meal is in some instances quite as good as 1lb. of the water-soluble phosphoric acid in superphosphate. He recommends to enrich soils poor in phosphoric acid by large quantities of Thomas meal and at a later period to distribute 200lbs. to 300lbs. of superphosphate on the rough furrow, and thereby to quicken the growth of the plants. His reason for selecting Thomas meal for application in the first instance is that it does not become so easily insoluble through forming new combinations in the soil, as is certain to be the case with superphosphate. Barley he mentions as a crop which demands a quicker and fuller source of phosphoric acid than oats, and the same is the case with clover and sugar-beets, which require just before sowing some superphosphate together with some nitrate of soda, in addition to a previous heavy manuring with Thomas meal. All small seeds also, which contain little or no nourishment in reserve, are much benefited by this way of manuring. Professor Dr. Maercker, of Halle, then reported on potash salts used for potatoes, barley,



lucern, and clover. Although the starch of the potatoes increased with all potash manures, the best crops were realised with muriate of potash: but neither barley nor lucern seemed to prefer muriate of potash. The chairman then mentioned that sylvinite, which contains much potash (and very much used in Great Britain) and is therefore much cheaper to transport greater distances than some other potash salts, will, in his opinion, in future be more used; and experiments should be made with it to ascertain whether it is preferable to any of the potash salts now used in such large and ever-increasing quantities.

186. *An Addition to the History of the Potato.*—A large block of granite, 6½ ft. high, containing on an iron tablet an interesting inscription, has been discovered at Brandhai in the Hartz Mountains, stating that in the year 1747 the first successful experiments were made at that place in growing potatoes. This was, therefore, before Frederick the Great compelled Pomeranians and Silesians to grow them.

187. *Bonemeal.*—Professor Dr. Julius Kuehn, who has always recommended its use to farmers, admits, to some extent, the correctness of the opinion of many scientists that it should be struck off the list of phosphoric acid manures, but only in so far that the phosphoric acid in it cannot give up its plant-food to shortlived cereals. He mentions barley as giving only one-tenth of the crop against another crop which had received superphosphate, and summer wheat giving only 9 against a crop of 100 with superphosphate; and the nitrogen in the bonedust may have given this small increase of 9 over unmanured land, which is about commensurate with the small percentage of nitrogen in it. Dr. Schultz-Lupitz stated lately that phosphoric acid in bonemeal will act, especially with leguminose, the second and third year. Only where humose acids act upon the phosphoric acid in moors is the action of bonemeal quicker, and it does not remain insoluble. He does not think that bonemeal should be buried deep. From experiments made in boxes he believes that a crop of rye, requiring a longer time to grow in poor non-retentive sand, in contradistinction to stronger soil, bonemeal, from which the glue is extracted, is more likely to give a good crop than superphosphate, and about equal to Thomas phosphate. The stronger the ramification of the roots the more can the very fine root hairs, by means of their acid secretions, act upon the phosphoric acid.

188. *Potatoes Soaked in Sulphate of Ammonia* are said to be a success if not left to soak more than twenty-four hours in this solution. Roots of the White Elephant had from ten to thirty-two potatoes, none weighing less than 5ozs. each, and many 1lb. and up to 2lbs. 3ozs. each. One Early Rose potato weighed 1lb. 10ozs., and tubers of two other unknown kinds weighed 12½ozs. each and 15½ozs. each, as reported by M. Temmett, of British Columbia.

189. *Redwater in Cattle (Hæmaturia).*—The Inspector of Diseases of Animals in British Columbia ascribes it to insufficient feeding. The food may be abundant in quantity but defective in quality, and the result is breaking up of the blood and tissues, whereby they are excreted or expelled from the body as so much effete material. It occurs in bad weather with damp lands and wet seasons, and, as elsewhere mentioned, it is produced by a variety of acrid wild plants, and hemlock (*Conium maculatum*) may be one of the principal causes. To give nutritious but easily digestible food in moderation, with eggs and milk and some chlorate of potash, is advised as medicinal and hygienic treatment.

190. *Purchase of Forests and Re-planting.*—The Legislature of the state of New York has ordered the purchase of lands at Adirondacks, to preserve the remaining forest trees, at a cost of one million of dollars. On the other hand, have the licencees for turpentine destroyed the whole of the forests in North Carolina and fully one-third of those of Georgia; while of the 350 Wellingtonia trees near Stockton, in California, only about 100 are left, and the Secretary of the Interior has asked for a picket of cavalry to protect these. The Wellingtonias, known as the "Mariposas" in the Yosemite Valley, are better preserved, as 650 are growing on 1,300 acres, and those where the tops are not broken off—are from 300ft. to 400ft. high. One can keep inside fifteen men on horseback, being partially hollowed out by fire. The bark of the "Grizzly Giant" is 2ft. thick, and, if hollowed out to the bark, the trunk could keep more cargo than the largest steamer yet built. Nobody believes that their age is less than 1,800 years. Five men were employed for twenty-five days to fell one of these big trees. They had to bore holes and to cut the intermediate parts with saw and axe. Prussia is constantly purchasing lands on the heaths of Schleswig-Holstein, which were centuries ago covered with oak forests, and furnished the piles upon which the city of Amsterdam is built. These lands are to be replanted with forest trees.

### Disinfection of Fruit Cases.

The secretary of the Coonawarra (Penola) Fruit and Vinegrowers' Association wrote requesting the Bureau to support their request that facilities should be made at the local and other railway stations for the disinfection of return empty

fruit cases. He pointed out that the fruit-growing industry was becoming very large there, and as they had codlin moth at Naracoorte and Mount Gambier it was evident that unless all cases were disinfected at the railway stations, the pest would soon reach Penola. The association was willing to pay the cost of disinfection, which should not be much, as at both Naracoorte and Penola steam jets could easily be provided from the stationary and pumping engines. They thought it should be compulsory for all empty returns to be disinfected at the dispatching stations to prevent the wholesale distribution of pests.

Mr. HOLTZE thought the suggestion to disinfect cases at railway stations by means of steam jets a good one. It would only cost a few pounds to erect a small shed, and as the Railway Department was liable, the same as anyone else, for distribution of fruit or cases containing codlin moth caterpillars, they should bear the expense, and charge a small sum for disinfecting the cases. Where jets from engines were available the work could be done in a few minutes most effectively. A few stations doing most of the business in fruit should be selected as disinfecting stations, and it should be made compulsory on consignors to treat the cases before sending them away.

The CHAIRMAN said there were many difficulties in the way of making such action general; but in this case, where they had an important district free of the pest, but with infected districts on both sides, it would be a good thing to carry out Mr. Holtze's suggestion, as most of the cases came back by rail.

The SECRETARY said he did not see how it was possible to carry out the suggestion. If it were done at one station it must be done at all, and this would mean considerable expense. At Adelaide thousands of cases were handled daily, and it was almost impossible to disinfect these. At Penola the association should erect its own tanks, and dip the returns, some of which came back by road, and not by rail.

Mr. GRASBY said disinfecting at the orchards was not effective. One grower dips all his cases and the neighbors do not, consequently his efforts to keep his garden clean are nullified.

Mr. PRICE thought the Bureau should take the matter up. There was no doubt that the railway carried most of the cases to Penola, and they should be treated before they left the station. It was not possible to ensure every case coming into the district being treated, but that was no reason why they should not make it as effective as possible. Other members agreed that the spread of pests of this character could be stopped to a considerable extent if all cases carried on the railways were disinfected at the dispatching stations, and the following resolution was carried:—"The members are of opinion that the desire of the Coonawarra settlers should receive the support of the Government, and ask the Minister to inquire of the Railway Commissioner whether he can arrange for the steaming of empty fruit cases at Penola at the cost of the settlers."

### Alkali Soils at Renmark.

The Renmark Branch forwarded report by Mr. W. H. Harrison, M.A., on the dying out of apricot trees on different plantations on the settlement. He attributed it to the excess of mineral salts brought to the surface by continued irrigation, and suggested that as the matter was of great importance to all the settlements on the Murray, the Government should be asked to cause an investigation to be made. The application of gypsum had not had the effect it should have if the mischief arose from excess of alkaline carbonates alone.

Members did not see what they could do in the matter, as the trees had evidently been planted on soil unsuitable for irrigation purposes. Mr. Holtze said they had the same trouble in India on the irrigation areas for years, and no treatment of any real benefit had been discovered.

### New Members.

The following gentlemen were approved:—Hartley—Mr. W. Fairweather. Mundooro—Mr. J. Loveridge. Riverton—Mr. C. C. Castine. Forster—Messrs. J. Johns, C. Bolt, W. Bennet, and J. Retallack. Davenport—Messrs. J. E. Lecky and E. C. T. Roberts. Norton's Summit—Mr. J. Hank. Crystal Brook—Mr. E. Dabinett.

### Reports by Branches.

The SECRETARY reported receipt since previous meeting of fifty-two reports of Branch meetings.

## REPORTS OF BRANCHES.

### Woolundunga, December 10.

Present—Messrs. T. H. Prosser (Chairman), W. McLaren, F. Sells, J. S. Partridge, J. Dunn, J. H. Michael, J. Grunike, and N. Rogers (Hon. Sec.).

QUESTION BOX.—A number of questions were asked, and the following were answered:—Onion seed should be sown in January or February, and plants set out in June. High winds and lack of moisture in the soil causes non-setting of grapes. Difference of opinion existed as to distance apart to plant apricots, some advocating 22ft. each way, and others 15ft. Members could not account for non-setting of fruit on apricots which bloomed freely.

WATER FOR IRRIGATION.—All members agreed that to pay 6d. per 1,000galls. for irrigation purposes in this district, where the rainfall is very light, would not be profitable.

WHEAT EXPERIMENTS.—Mr. Michael reported that Dart's Imperial wheat did fairly well till August, but did not stand the dry season. Steinwedel and Premier wheat did best in such seasons. The latter had no rain until just when coming into ear, but gave 6bush. per acre. Some Steinwedel sown in July, on flooded land, gave at the rate of 5 tons of hay per acre. Mr. Dunn said his experience with Dart's Imperial was the same as Mr. Michael's. He agreed, also, that Steinwedel and Premier were the best in dry seasons. Brook's Wonder also did well.

RAISIN-DRYING.—The Hon. Secretary read a short paper on raisin-making for home consumption.

VISIT TO HOMESTEAD.—This meeting was held at Mr. Prosser's residence, the stock and farm appliances being carefully inspected. Mr. Prosser, who goes in extensively for dairying, has all the latest appliances for butter-making, and turns out a splendid article. He is steadily improving his herd by using a pure-bred Jersey bull and culling out the inferior cows.

### Clare, December 10.

Present—Messrs. G. Lloyd (in chair), W. S. Birks, J. Treleaven, J. T. Hague, H. Carter, W. Knappstein, and W. Kimber (Hon. Sec.).

FRUIT CROP.—Members generally reported promise of a light crop of most fruits, though there had been a heavy setting of currants, and, in a few instances, good setting of apples.

PESTS.—Members reported serious ravages by caterpillars. The young bark on three or four year old vines was gnawed off, gooseberries, peas, and even garden plants seriously injured. Mr. Birks said in the Angaston district the young apple and apricot trees were severely attacked. Mr. Hague said his

fowls were waging war on these pests, scratching round the trees and vines and searching for them. The magpie, and even the despised crow, were doing good service in the same direction.

**MANURING.**—The Hon. Secretary thought attention should be called to the danger of the continued use of only phosphatic manures with the seed drill. Unless other constituents were replaced the land would soon become more impoverished than ever. Mr. Birks agreed that it would be necessary to manure with nitrogen and potash, as well as with the phosphates. Bonedust contained nearly all that was necessary, but very little result was obtained the first year. It had a beneficial effect for from three to five years at least. Mr. Carter said that at Yackandandah Mr. John Smith gave some pasture land a good dressing with bonedust about twenty years ago, and the effect was still noticeable. Mr. Lloyd said years ago the Scottish farmer found that by continuously applying nothing but commercial fertilisers the land got into such a condition that it would not produce good grain crops.

**BINDER AND HEADER.**—The Hon. Secretary referred to increased acreage cut with the binder and threshed by means of the header, and asked whether this could be done and full justice given to the miller and chaff merchant? Mr. Lloyd said no. It stood to reason that chaff cut from headed hay was not so nutritious as hay cut at an earlier period, and as the grain was not so good the millers would soon make a reduction in the price of headed grain, so that in the end he was sure the practice would not pay the grower. [It has been proved again and again that wheat, when reaped just after the dough stage is passed, is of better quality in every way than when left till dead ripe —*GEN. SEC.*] He admitted that in England wheat was cut in the milk stage, but then our millers would not look at English wheat. Mr. Carter agreed. He felt that to carry out the practice of binding and thrashing produce for market was a serious mistake. He knew of one firm of millers who, unknowingly, purchased grain from the header last year, and they had given their buyers instructions to pay reduced price this year for such grain. Good white flour could not be made from it. Mr. Lloyd said he would advise farmers to cut sufficient acreage with binder to provide themselves with seed, and to give a stack of headed straw for winter feed for their stock, but not to go any further.

### Pine Forest, December 14.

Present—Messrs J. Phillis (Chairman), D. F. Kennedy, J. St. J. Mudge, A. Mudge, J. Zilm, A. Inkster, and R. Barr, jun. (Hon. Sec.).

**BUNT.**—The Chairman and Hon. Sec. stated that they found the crops from wheat coated with artificial fertilisers much more liable to bunt, even when pickled with bluestone, than untreated seed.

**HOMESTEAD MEETINGS.**—Mr. Barr read the following paper on this subject:—

On the recommendation of the General Secretary, some years ago, many of the Branches of the Agricultural Bureau adopted the plan of members and their families meeting at each other's homesteads, more or less frequently, according to their sociability. As a rule such meetings have been better attended, more interesting, and more instructive than the ordinary gatherings in a meeting-house. Our own Branch has carried out the practice pretty largely, both as regards their frequency and their extensiveness, so that whatever good qualities we lack sociableness is not amongst them. It is because of an apparent tendency to sacrifice the practical for the pleasurable, the useful for the ornamental, that I address you on this subject. To make the most of these meetings from a practical point of view at least three things should have attention viz., inspection, discussion, and criticism. When members meet early in the afternoon at the farm of one of their number, time should certainly be taken to inspect the farm buildings, stock, and implements, garden, and orchard, &c. It is showing scant courtesy to a member in accepting his invitation to attend a homestead meeting to either refuse to

inspect the surroundings when you get there, or to show by lack of interest that you consider the whole affair as a waste of time. Then it is helpful to discuss different methods of working. Our aims may be similar, but our manner of arriving at the desired end may be very diverse, and although much of the surroundings may be commonplace enough, some part of every farmer's work, from the topping of a stack to the swinging of a gate, is worthy of attention, if not imitation.

With regard to criticism, although it is generally advisable to "shut your own garden gate," when you visit your neighbors it is not out of place, and should not be taken amiss to draw the attention of the owner to any piece of bad management in connection with any part of the farm work, and suggest an improvement. If he is aware of the defect, an opportunity is given of explaining the position, and if he is not, the visitors get a chance of doing a good turn. For instance, when inspecting the livestock, a horse or cow may be discovered suffering from some ailment the nature and treatment of which is quite unknown to the owner, but familiar to another member. Why then "a guid advicesement comes nae ill," while the like would apply to a deformed or diseased tree in the orchard, a broken down fence, or a set of wagon wheels gaping for paint.

Any assistance we can render each other in the preservation of property of any kind, so that we may spend less in the working of the farm, or in teaching how to produce and sell more, is legitimate business for homestead meetings. There are other good objects to be attained by co-operation, and these meetings, if properly carried out, all tend to cohesion among the farmers of any neighborhood. It is sometimes an advantage to club together for the purchase of expensive machinery, but it is not always possible to get enough cohesiveness even for that.

### **Bute, January 4.**

Present—Messrs. A. Schroeter (in chair), H. Schroeter, M. Stevens, J. J. Chapman, E. Ebsary, W. H. Sharman, D. Green (Hon. Sec.), and one visitor.

**HARVEST.**—Considerable discussion took place on the result of the harvest. Members were of opinion that the crops in the hundred of Wiltunga would not average more than 3bush. per acre. Many farmers who expected to get from 5bush to 7bush. per acre only harvested 3bush. to 4bush., the discrepancy being due to prevalence of "dummy" heads in the crops. Members attributed these "dummy" heads to absence of rain in September and to the hot winds. Mr. Schroeter reported rainfall for twelve months 11·275in.

### **Hartley, January 5.**

Present—Messrs. J. Harvey (Chairman), A. Dalton, A. Thiele, A. McDonald, H. Reimers, W. Klenke, W. Kutzer, J. Stanton, T. Jaensch, jun., J. Ferries, jun., (Hon. Sec.), and one visitor.

**DRILLING VERSUS BROADCAST SOWING.**—After a long discussion, with advocacy of both methods, a majority decided that broadcasting is the best method of sowing grain, as drilling takes up too much time and is expensive.

### **Mount Remarkable, January 5.**

Present—Messrs. A. Mitchell (Chairman), S. Challenger, W. Girdham, A. Pope, W. Lange, G. Yates, C. E. Jorgensen, H. B. Ewers, and T. H. Casley (Hon. Sec.).

**OFFICERS.**—Mr. H. B. Ewers elected Chairman, Mr. S. Challenger Vice-chairman, and Mr. T. H. Casley Hon. Sec. Past officers thanked for services.

**BIRD PESTS.**—Serious losses are suffered in this district from ravages by birds, some of which do not recompense by destroying injurious insects.

### Murray Bridge, January 8.

Present—Messrs. F. H. Wurm (Chairman), W. Lehmann, W. Schutzel, G. Block, B. Bretag, W. F. Wundersitz, R. Edwards (Hon. Sec.), and one visitor.

BUSINESS.—Formal business only was transacted. Members promised to furnish particulars *re* drilling seed with fertilisers.

### Stansbury, January 8.

Present—Messrs. Alex. Anderson (Chairman), J. Henderson, J. Antonio, G. Blundell, and C. Faulkner.

PRIZES FOR DRILLED FERTILISERS.—Letter read from Mr. Francis H. Snow, withdrawing prizes offered for wheat and hay fertilised with Star Standard phosphates, &c., in consequence of failure of harvest on account of bad season, but would offer them again next season. He would allow the prizes to stand for potatoes and other vegetables. Members considered it is a wrong principle to offer prizes and then withdraw them. The harvest having been a failure was a poor excuse, as in some parts of the colony the crops were better than last year. A dry season was the best time to try manures. Ultimately a motion was carried "This meeting considers that these prizes should be awarded in their entirety, as it is misleading to the public to offer prizes and then withdraw them."

### Finniss, January 10.

Present—Messrs. T. Collett (Chairman), A. Willcock, W. W. Heath, T. Sumner, P. Gooding, S. Collett (Hon. Sec.), and one visitor.

BUSINESS.—Several circulars and letters of local interest were dealt with.

DISEASE OF COWS.—In many cases cows in this district have been affected with stiffness in the joints. [Probably due to dry innutritious food and indigestion.—GEN. SEC.] In two instances fattened cows, killed as beef, have shown hard stony substances as large as peas in the kidneys. [In such cases, portion of the affected organs should be forwarded direct to Mr. C. J. Valentine, Chief Inspector of Brands, together with a full description of the symptoms and appearance of the animal before death. It is just possible that these may have been tuberculous animals, and the flesh would be dangerous to the persons using it.—GEN. SEC.]

EXHIBITS.—Mr. Sumner tabled apricots destroyed by heat. Mr. Heath tabled Juncatings and Caroline or Red June apples.

### Port Lincoln, December 17.

Present—Messrs. S. Valentine (Chairman), J. D. Bruce, F. Chapman, W. Laidlaw, Jas. O'Shanahan, J. P. Barraud, and J. Anderson (Hon. Sec.).

COAST DISEASE.—Mr. Anderson said if a very small quantity of sulphuric acid were added to water in which sulphate of iron is mixed for coastly stock, it would keep the iron in solution for weeks. It would give a slightly acid taste to the water, but not sufficient to prevent stock using it.

PIED FLY-BUG.—Mr. Barraud reported that two of his vines had been destroyed by a small grey fly, which had settled on them and completely covered the branches, &c. [This fly-bug (*Rhyparochromus* sp.) is a native, and common in Victoria and South Australia. In the sister colony it is called "The Rutherglen Fly." It was named "Pied Fly-bug" by the late Fraser S. Crawford, and is mentioned in his paper read at the first congress of the Agricultural Bureau. This bug is reported from Penola, from Renmark, Port

Lincoln, and many other far-distant parts this year as infesting fruit, vegetables, and other crops. It often attacks cereal crops when nearly ripe, but in such cases very little damage is done. Mr. Chas. French, F.L.S., Government Entomologist, Victoria, says the only effectual thing to destroy them is benzole applied as a spray. He recommends removal of everything that will harbor them; but says they will collect at night in old straw placed near the trees, and that this straw can be removed early in the morning, sprinkled with coal-tar or kerosene and set fire to.—GEN. SEC.]

**COMMERCIAL FERTILISERS.**—Mr. JAMES O'SHANAHAN gave his experience with commercial fertilisers. He said that a good rainfall is essential to success with these, but the years 1896-7 gave the lowest rainfall known for many years. In 1896 he used 1 ton finely-ground bonedust, 1 ton of Adelaide Chemical Company's superphosphates, and 4 tons of Caves guano. The bonedust and superphosphate were sown broadcast with the seed, at the rate of 2cwt. per acre, costing 7s 6d and 10s. 6d. respectively, and the Caves guano was sown broadcast to the extent of 250lbs. per acre, costing a little over 6s. per acre. The yield of straw and grain upon the land dressed with superphosphates and bonedust was far superior to that from the land treated with Caves guano. For 1897-8 he used 2 tons bonedust,  $\frac{1}{2}$  ton of Reliance superphosphate from Sydney, and  $\frac{1}{2}$  ton of Thomas Star phosphate powder. The bonedust cost 3s. 6d. per cwt., superphosphate 6s. 6d., and Star phosphate 4s. 6d. It was sown at the rate of 2cwt. per acre. The bonedust did well, Reliance super next, and Star phosphate was a complete failure. Elsewhere it appears to have done well upon limestone formation. This year he sowed 1bush. of Cape barley on an acre dressed with 2cwt. bonedust, and had a yield of 50bush. of fine plump grain. Mr. BRUCE used 2cwt. to the acre of Island guano, at 35s. per ton, and reaped 18bush. of Early Para wheat. On similar adjacent land, not fertilised, he reaped only 9bush. per acre. Mr. BARRAUD tried 3cwt. per acre of super-guano from Adelaide Chemical Works, at £3 10s. per ton, and got about  $1\frac{1}{2}$  tons wheat-hay per acre. Mr. BROWNE applied 5cwt. per acre of Cave's guano last year, at £3 10s per ton, and reaped 8bush. wheat per acre. This year (1897) he put nothing on the same land and got 16bush. to 18bush. wheat per acre. Five acres cut for hay gave  $1\frac{1}{2}$  tons to the acre. Part of the land was poor sandy soil, which would grow nothing before the application of guano. Mr. CHAPMAN used 2cwt. Flinders Island guano per acre, and reaped 15cwt. hay per acre. There was no crop where guano was not used. Mr. VALENTINE used 2cwt. per acre of Flinders Island guano at 60s. per ton, and reaped quite double the weight of hay that was scoured from the same land last year without the guano. On spots where rubbish had been burned the crops were quite 9in. taller and much thicker. Mr. LAIDLAW applied 6cwt. English superphosphate on four and a half acres of land at a cost of 10s. per acre, and reaped about 15cwt. hay per acre.

**CLEARING YACCA LAND.**—Mr. Chapman read the following paper:—

An acre of heath land, when cleared of the so-called "Yacca" or "Grass-tree" (botanically *Xanthorrhoea*), is of more value for pasturage purposes than three or four acres left uncleared. The yacca takes so much out of the soil that grass has no chance to grow. It is necessary to remove the whole of the butt from the ground, because the smallest piece left will grow again and cause extra work in clearing later on. After clearing it is best to use a set plough for the first two ploughings, as this tears up the ground much better than a stump-jump plough. The land should be fallowed the year before sowing. A single acre once tried for grain gave 26bush., and the rest was cut for hay. Yacca land will not yield crops unless manured. Guano gives good results. Amongst the gullies on such lands, fruit trees and vines ought to do well.

Mr. ANDERSON said that if, when the yaccas have been chopped level with the ground, a very small quantity of kerosene were poured on the stump and set alight next day, it would burn it up, and completely prevent new growths.

### Quorn, January 6.

Present—Messrs. John Cook, (Chairman), R. Thompson, Jas. Cook, G. Altmann, C. Patten, and A. F. Noll (Hon. Sec.).

BUSINESS.—Owing to absence of the member who had promised to provide a paper for discussion, only routine business was dealt with.

### Meadows, January 3.

Present—Messrs. J. Catt (Chairman), T. B. Brooks, W. Pearson, W. J. Stone, H. V. Wade, W. A. Sunman (Hon. Sec.), and one visitor.

CROPS.—Owing to the great heat, drought, caterpillars, locusts, &c., the fodder crops are reported to be a complete failure. The fruit harvest will be very poor. Live stock still in fairly good condition. Cereal harvest about completed, with very satisfactory results. Some of the pea crops average over 20bush. per acre.

### Mount Compass, January 12.

Present—Messrs. J. Youlton (Chairman), W. Wright, S. Athurs, R. Peters, M. Jacobs, W. Gowling, H. McKinlay (Hon. Sec.), and one visitor.

EXHIBITS.—Profusion and Quality peas, very prolific and splendid quality; also Dart's Imperial wheat, Danish Island oats, and Herd grass.

SEASONABLE OPERATIONS.—Continued planting potatoes; sow peas, turnips, cabbage, radish, and Shorthorn carrots.

APPLE-TREE PLANTING.—A paper by Mr. A. J. Hancock was read, giving his experience in planting apple trees in the gullies of the hilly country. After burning the timber and scrub he planted his trees 18ft. x 20ft. apart, in holes 18in. deep by 3ft. wide, filled with the best soil procurable. The roots were spread out and the soil pressed firmly around them. Part of the land was dug all over and vegetables cultivated between the trees. In two years' time the trees upon the cultivated land were three times as large as those grown in holes upon the unbroken grass land, notwithstanding that they were dug around once and hoed twice each year. The land was too hilly and full of roots to plough, so it had to be dug. When trees are growing strongly they seem to be less affected by pests. The varieties grown are Cleopatra, Rome Beauty, London Pippin (called Five-crown), Rymer, Jonathan, Reinette de Canada, and Strawberry Pippin. They all produce very fine, large, high-colored fruit.

### Strathalbyn, January 10.

Present—Messrs. M. Rankine (Chairman), B. Smith, H. H. Butler, A. Rankine, W. M. Rankine, G. Sissons, L. E. L. Dunn, W. Graham, E. R. Morgan, W. J. Tucker, R. Watt, John Cheriton (Hon. Sec.), and one visitor.

CONFERENCE.—Resolved to call a conference of Southern Branches, to meet at Strathalbyn during the last week in March.

EXHIBITS.—By Messrs. W. J. Tucker and W. M. Rankine—Fair samples of Dart's Imperial wheat, grown from Central Bureau seed; also Purple Straw and Steinwedel, which produced from 16bush. to 23bush. per acre. Very fair samples considering the season.



**JERSEY BULL.**—Mr. Watt reported having inspected the Jersey bull lent by the State Agricultural Department, and said it was well cared for by Mr. Butler.

**HOW TO MAKE FARMING PROFITABLE**—Mr. H. H. Butler read the following paper:—

To all who are dependant for their livelihood from the soil it is, of course, their chief aim to make farming as profitable as possible. The chief essentials to accomplish the above are a good average rainfall and cheap land. Land in South Australia has had inflated values, and speculative also, altogether beyond its fair producing value, that has been dearer in proportion to its productions than in any of the other colonies, resulting in making hundreds of our most industrious producers mere beasts of burden, especially with the high rates of interest charged until of late. A man requires every penny he can scrape together for improved machinery and thorough cultivation, and if he has to strain every nerve simply to pay excessive rents or high interest he cannot in the long run make farming profitable. However, given a property at a reasonable rent, in the greater portion of our agricultural lands mixed husbandry is most profitable, and the better the rainfall the greater the variety of the husbandry can be. To economise labor good machinery should be procured and carefully housed, and dairying should be carried on in conjunction with pigs. Immense improvement is capable in dairy herds, as it costs as much to keep a bad animal as a good one, and I believe our output of dairying could be doubled without increasing numbers by keeping better dairy cattle. We cannot compete under ordinary circumstances with New South Wales and Queensland in fattening cattle and sheep, but in spite of this I consider sheep one, if not *the most* profitable thing kept on a farm. As the result of shipping good lambs through the State Export Department proves breeding fat lambs from sheep most suitable, I prefer a large-framed Merino ewe crossed with Down or Lincoln ram. Perhaps the former ram preferable on account of the lamb maturing more quickly will always pay, as there is now no necessity to give good lambs away in Adelaide on a plentiful season at 3s. to 4s. when double that amount can be made by shipping. Sheep are also of great assistance to a farmer in cleaning his land, which is most necessary, as we all know what a glut hay becomes when the colony is blessed with two or three good years. As regards plauting cereals, I should advise cropping only once in two or three years on land well fallowed. I think if these suggestions, or most of them, could be carried out our farmers would become more prosperous.

### Mount Gambier, January 8.

Present—Messrs. J. Umpherston (Chairman), D. Norman, jun., T. H. Williams, John Watson, M. C. Wilson, J. C. Ruwoldt, and E. Lewis (Hon. Sec.).

**ENGLISH HOUSE SPARROW.**—Upon announcement of the receipt, amongst a lot of other pamphlets, reports, &c., of a number of copies of Miss Eleanor A. Ormerod's leaflets on the English House Sparrow, a number of members spoke of the mischief done by these birds amongst the fruit and grain crops, and of the very small amount of good effected by them as insect destroyers. They drive away all the insect-eating birds. The Chairman said they had taken about four acres of his barley crop. They ate all the grain for about half a chain from any fence that afforded them shelter.

**SOUTH-EASTERN CONFERENCE.**—A communication was received, stating that the Tatiara Branch had arranged to call a conference of South-Eastern Branches at Tatiara early this year.

**IMPACTION OF OMASUM.**—Mr. T. H. Williams reported that, as he had expected, several cases of impaction in dairy cattle had recently occurred.

### Yorkestown, January 8.

Present—Messrs. J. Koth (Chairman), A. Jung, G. Bull, J. H. Thomas, F. Siebert, and John Davey (Hon. Sec.).

**CROPS.**—Members reported the wheat crops of this locality to be light;

some of the drilled crops were disappointing. Rainfall during the growing season was patchy, and where crops of oats and wheat were put in early and got the early and later rains the yields were fairly satisfactory. Those who drilled crops late suffered some loss.

**HAY.**—In a discussion upon the best cereal for a hay crop it was considered that a mixture of wheat and oats, cut when in bloom, gives the best result.

**FRUIT.**—Fruit crops are very poor on account of drought and hot winds.

### Arden Vale, January 10.

**Present.**—Messrs. A. Hannemann (Chairman), M. Eckert, M. Searle, C. Pearce, D. Liebich, J. Francis, A. W. Fricker, L. Warren, E. H. Warren (Hon. Secretary), and three visitors.

**FERTILISERS.**—Mr. Eckert said he noted no improvement in crops, whether top-dressed with Thomas' phosphate or when scarified in at the rate of 1cwt per acre. Some improvement was evident where horsedung had been used.

**WHEATS.**—Mr. C. Pearce said he had sown a large number of new varieties of wheats when the season opened so favorably, but the absence of later rains had caused a failure in every case.

**EXHIBITS.**—The Chairman tabled samples of Dart's Imperial, Ward's Prolific, and Baroota Wonder wheats. Baroota Wonder is considered a promising variety for this district, and Dart's Imperial worthy of a further trial.

**TANNING HIDES.**—Mr. Fricker detailed his method of rough tanning of hides for use on the farm, as follows:—

Place the hide in a thick batter of lime water till the hair comes off readily. This takes about three days if the hide is kept wet. It should then be well washed, and every particle of flesh most carefully scraped off. Make the tan of the color of strong tea by boiling short-chopped wattle bark in water. Immerse the hide in this, and add more tan as it becomes absorbed. When the hide is tanned right through all creases should be rubbed out, and a mixture of equal parts of whale oil or neatsfoot oil and mutton fat rubbed in. If this does not make the hide soft enough rub in some more whale oil, or use castor oil.

**WATER RESERVOIRS AND DAMS.**—Mr. J. Francis said the scarcity of water showed the necessity for the construction in suitable places of large reservoirs, and suggested the following method of construction:—

Peg out the position of the reservoir thoroughly square, and plough the boundary lines to show exactly where to throw out the plough. It is best to plough out narrow strips, about 4yds. wide, and reverse the ploughing every other time. Care should be taken to keep the slopes of the right pitch, otherwise holes are made in the bank, which are dangerous to the leading horses. A fall of three in one is about the general slope. [This appears excessively steep. Three in two would be nearer the mark. (GEN. SEC.)] If the reservoir is a large one the earth should be carried a chain distant at the start. The handle scoops are preferable, because the spoil can be carried any distance and be tipped and spread at the same time.

A discussion ensued in which members criticised the various patterns of scoops, and directed attention to their imperfections and advantages.

**FLOURMILL NEEDED.**—Mr. Hannemann opened a discussion upon the necessity for a flourmill at Quorn, and adduced figures which showed that at present farmers are losing considerably. Good seasons must soon be expected, and the subject of a flourmill at Quorn should be discussed with the Farmers' Union. Most of the members agreed with the chairman that such an institution should be supported by all farmers in the district, as they were paying too much at present for flour and horsefeed. Mr. Pearce saw a good deal of difficulty in the way. Failure of crops in the north had something to do with the high prices, although, as producers, farmers paid too much for flour and

horsefeed. The present charge for gristing was 1s. 3d. per bushel. It was decided to write the Quorn and Richman's Creek Branches and the chairman of the Farmers' Union on this subject.

**CROPS AND RAINFALL.**—The season's yield of wheat in hundreds of Yarrah and Wyacca is estimated at  $1\frac{1}{2}$  bush. per acre. The rainfall for year 1897 was reported as follows:—By Mr. Hannemann, 8'950in.; Mr. Eckert, 8'000in.; Mr. Searle, 11'595in.

### Lucindale, December 23.

Present—Messrs. E. Feuerheerd (Chairman), L. McInnes, B. A. Feuerheerd, and H. Langberg.

**EXPERIMENTS.**—This meeting was held at the residence of Mr. Langberg for the purpose of inspecting crops, &c. The garden looked very well and free from disease, excepting some slight signs of anthracnose. In the field some children were threshing crimson clover, which had been mown for seed. The plant grows 18in. to 2ft. high, and should be grown largely in the district with hay crops. A field of white Tuscan wheat will average 15bush. per acre; portion was manured, but no improvement was noticeable. Alongside were two varieties of oats, Algerian and New Zealand white, both of which will yield heavily. A two-acre plot of wheat, purchased as Medea, looked well, averaging 5ft. 6in. high, but Mr. B. Feuerheerd said this was not the true Medea as grown at the college. Small plots of Xeres, Red Winter, and Dart's Imperial wheat looked well, while on a field of five acres the flax was 2ft. 6in. high, but the seeds were totally destroyed by "grubs." Mr. Langberg put in a field with Tuscan wheat by means of the drill, but owing to not knowing how to regulate the delivery of seed he only sowed 15lbs. per acre, Thomas phosphate being sown with it. Notwithstanding this light sowing, and the ground being poor and cold, the crop will average 15bush. per acre. Unmanured strips were very inferior. Thomas phosphate has given very fair results, better, in Mr. Langberg's opinion, than bonedust.

### Onetree Hill, January 7.

Present—Messrs. J. Bowman (Chairman), F. Bowman, G. Bowman, A. Adams, E. A. Kelly, W. Kelly, H. H. Blackham, A. Thomas, and J. Clucas (Hon. Sec.).

**VISIT TO HOMESTEAD.**—This meeting was held at Glenburnie, the residence of Mr. F. Bowman, for the purpose of inspecting the homestead and appointments. As the section is very hilly, the roughest portion is reserved for sheep, both mutton and wool of high quality being produced. Where practicable the land is cultivated, the return being generally satisfactory. The present season's hay crop gave more than 2 tons to the acre. To house his hay Mr. Bowman has constructed a rough frame structure of redgum posts and saplings, into which the hay is stacked, and then thatched with grass-tree. Other outdoor sheds are similarly constructed. The apiary at Glenburnie has been in existence for many years, and now consists of nearly 200 hives, the most modern appliances being used throughout. In order to supplement the natural bee-forage, Mr. Bowman has been growing sunflowers, and, although on a small scale, the experiment has proved a distinct success. Water is laid on to the garden, a force pump being used to give the necessary pressure. In a gully is an ingenious contrivance for watering from a well about 15ft. deep. This is in the shape of a siphon, a kerosene tin being used as a supply cistern,

and with a short piece of hose or piping and a plug, the flow of water to a dam 60yds. away, to which stock have easy access, is readily regulated. In the fruit garden the trees showed very strong growth, in fact, in the opinion of members, there was too much growth, and scientific pruning was required to get a good setting of fruit. After inspection members were entertained by Mr. and Mrs. Bowman, and a vote of thanks brought an enjoyable and instructive meeting to a close.

### Renmark, December 10.

Present—Messrs. F. S. Wyllie (chairman), R. Kelly, A. L. Acason, H. G. Swiney, H. Fetch, H. Showell, W. H. Harrison, E. Taylor, Captain Moffatt, and W. H. Waters (Hon. Sec.).

PAPER.—Mr. Kelly read an interesting paper on the possibilities of wheat-growing within the Renmark area, which was well discussed.

ALKALI SOILS.—Considerable anxiety is being occasioned by the numerous losses of apricot trees on the settlement, caused apparently by the excess of alkali in the soil. Treatment of the soil with gypsum has not had the result expected.

### Gawler River, January 6.

Present—Messrs. A. M. Dawkins (Chairman), J. Hillier, F. Roediger, A. Bray, J. S. McLean, J. Bushbridge, R. Badcock, G. Johnston, H. Roediger (Hon. Sec.), and one visitor.

CARE OF FARM IMPLEMENTS.—A very interesting discussion on this subject took place, members generally being of opinion that the necessary outlay for shelter sheds for implements and for painting was well repaid by the increase in the life of such implements. Mr. Badcock thought the present a suitable time for painting, and advised farmers to buy dry paints and mix them for themselves. The Hon. Sec. preferred raw linseed oil to boiled, as he considered it penetrated and preserved the wood better; he always used patent dryers with it.

DEATH OF MEMBER.—Regret was expressed at the death of Mr. Eli Dawkins, one of the members of the branch, and it was decided to send a letter of condolence to the family.

### Forest Range, January 6.

Present—Messrs. J. G. Rogers (Chairman), S. A. Collins, J. B. Fry, H. Caldicott, R. E. Townsend, A. Green, G. Monks, W. Cherryman, R. M. Hackett (Hon. Sec.), and three visitors.

CO-OPERATION.—Mr. G. Monks read the following paper on this subject:—

The first question to be answered is—What is co-operation? The answer is—The unity of individuals, to work together for their common good. It is at once a selfish, and yet a very unselfish, system; selfish because it better the condition of the individual, unselfish because each individual helps by this means to better the condition of his fellows. How does it better such condition? By or on account of its being the means of better prices being realised, and better and more markets opened up for produce than can be done under any other system. By the present cut-throat system, or non-system, everyone is struggling to get rid of his produce, entering at once into direct competition with his neighbor. The result is that he not only injures his fellow, but whilst doing so succeeds in cutting his own throat.

Co-operation means the abolition of individual competition as far as the marketing is concerned. We shall still have competition, but it will be reduced to a minimum, as it

will then only be between large companies. The question is asked in some quarters—What shall be done with produce in times of glut? The answer to that is—There will be no gluts. If every consumer gets what he or she wants they can take all that is now produced, and a great deal more.

Under the present style of distribution, the produce having to pass through so many hands, all requiring profits, one-half, or more than one-half of the consumers cannot afford to purchase on account of high prices, and as a consequence they are compelled to go without.

Under a co-operative system producers and consumers are brought together. There is a bond established between them at once. The producer, whilst receiving more for his produce, is in a position to supply the consumer at a much lower rate, thereby increasing the purchasing power of the buyer almost, if not quite, twofold.

Now the question arises—How can such a co-operative system be organised and worked? In the first place the producers should have the whole thing in their own hands, so as to secure the whole of the profits accruing therefrom. A meeting should be held to see if such a society is required, and also if the producers are willing to work together for such aims and objects. These questions being answered in the affirmative, a committee of five should be chosen to work the matter up and float it into a co-operative company, such committee to be allowed, as compensation for such services, 5 per cent. upon the application fee, which should be 5s. per share. Shares should be £1 each, liability limited to that amount. There should also be a limit to the amount of shares that one person should hold, say, a minimum of five and a maximum of twenty. I think the whole of the money should be paid as follows.—Five shillings per share upon application and the rest upon allotment, as it will all be wanted on account of so much funds being required to establish a going concern, as jam and preserving factories, also other works, will be wanted, not only in the city, but in the fruit and vegetable growing centres, because the carriage will be so much less when these are condensed than it would be in its raw state. A directorate of five and a competent general manager, with assistant or under manager at the several depôts, should be elected by the shareholders, each shareholder having only one vote, whether he has five or twenty shares. Nothing less than 30,000 shares at £1 per share should be attempted in connection with a market gardeners' fruit and vegetable co-operative society, and at least one-half this amount should be allotted before such company is registered.

The expense of floating such a company would only be £375, supposing all the shares were allotted, that is without printing and a few other items, which would not amount to a great deal.

Considerable discussion followed, members generally agreeing that great benefit would be derived by producers and consumers under some such scheme as indicated by Mr. Monks. It was pointed out that much depended upon the selection of directors and manager, and on getting the majority of the growers to unite. It was agreed that a co-operative jam factory turning out first-class stuff would command a ready sale for its jams, &c., and would be able to pay the growers a fair price. The hon. sec. stated that last year sixteen of the larger growers in this district sold the following quantities of fruit:—Apples, 10,876bush.; pears, 220bush.; plums, 2,459bush.; peaches, 153bush.; cherries, 140bush.; gooseberries, 379bush.; quinces, 171bush.; strawberries, 1,336lbs.; blackberries, 25,553lbs.; raspberries, 37,781lbs. This was only a small proportion of the produce of the district, and in some fruits the individual output is much larger. Owing to the dry season, fires, and frost, there was little danger of a glut in any fruit this year.

### Mundoora, January 7.

Present—Messrs. J. Blake (Chairman), R. Harris, W. Aitchison, W. D. Tonkin, N. J. Francis, W. J. Shearer, W. Longmire, T. Haines, T. Watt, D. Smith, and A. E. Gardiner (Hon. Sec.).

Crops.—Members furnished reports on the harvest, from which it appears that the yield in most cases has been 2bush. or 3bush. per acre under the estimate, the hot winds and dry weather having had a worse result than was expected. Early Para and Steinwedel wheat have been grown by most

farmers, and, being early, have generally given better results than other varieties. Red Straw, Budd's Rust-resistant, Leather Jacket, and Californian Clubhead were mentioned by members as having given better results than either of the two first mentioned in individual cases. Mr. Harris got 12bush. per acre of good clean sound grain from Californian Clubhead.

**FRUIT HARVEST.**—Members generally reported fruit trees and vines suffering severely from the dry season. Mr. Tonkin said he found the Doradilla grape stood the dry weather better than any other variety, and recommended it for dry districts.

### Riverton, January 8.

Present—Messrs. H. A. Davis (Chairman), T. Gravestock, D. Kirk, A. B. Welch, O. H. Castine, and H. A. Hussey (Hon. Sec.).

**WHEAT EXPERIMENTS.**—Mr. Gravestock reported on trials with various wheats as follows:—Dart's Imperial, manured with Thomas phosphate, a total failure on loose limestone soil, manure too strong; Dart's Imperial, unmanured, 1½lbs. seed sown produced 40lbs. good grain; Gravestock, 2oz. sown, yield 3lbs. 12oz. good grain; Cowan's Purple Straw, 2oz. sown, yield 2lbs. 12oz. fairly good grain.

### Koolunga, January 5.

Present—Messrs. T. B. Butcher (Chairman), R. H. Buchanan, J. Sandow, W. T. Cooper, R. Jackson, E. J. Shipway, W. Ballinger, J. Button, and J. Butterfield.

**STOCK DISEASE.**—Mr. Sandow reported that a large mob of cattle near Yacka were suffering from pleuro. These had been brought into the district for feed, and were allowed to water at the river Broughton. It was decided to ask the authorities to take steps to keep the cattle from the river.

**WEED.**—The chairman tabled sample of weed with yellow flowers, which he believed to be the true star thistle. [This is *kentrophyllum lanatum*, or so-called Barnaby thistle. The true star thistle (*centaurea calcitrapa*) is generally smaller, and has purplish flowers. See illustrations and descriptions on pp. 98 and 190 of *Journal of Agriculture and Industry*.—GEN. SEC.]

### Cherry Gardens, January 11.

Present—Messrs. E. Wright (Chairman), C. Lewis, T. Jacobs, J. Mackereth, G. Hicks, J. Choate, and C. Ricks.

**BENEFICIAL INSECTS.**—Mr. Jacobs reported having noticed a wasp-like insect attacking the caterpillar which had done so much damage to the potatoes and onions.

**ENTOMOLOGIST.**—Members supported resolution, carried at the Hills Conference of Branches, urging the appointment of an economic entomologist.

**BRANCH SHOW.**—The date for the produce show in connection with the Cherry Gardens, Clarendon, and Belair Branches, was fixed for Thursday, March 17th.

### Tatiara, January 8.

Present—Messrs. G. Ferguson (Chairman), J. Rankine, W. Montague, D. Makin, R. Scown, J. Green, F. Smith, Thos. Stanton, and W. E. Fisher (Hon. Sec.).

**SHEEP DIP.**—The Chairman called attention to the arsenic-sulphur dip recommended by Stock Inspector Williams. It was made as follows:—Boil 100ozs. arsenic and 10lbs. soda in 30galls. of water; dissolve 20lbs. home-made or soft soap; boil 40lbs. of sulphur and 3lbs. or 4lbs. of soda for about three-quarters of an hour, keeping it well stirred. Mix together and add to 400galls. of water. This dip will cost about 7s. per 1,000 sheep.

**SOUTH-EASTERN CONFERENCE.**—Matters in connection with the annual Conference of South-Eastern Branches, to be held at Bordertown about the middle of March, were dealt with.

### Angaston, January 15.

Present—Messrs. R. Player (Chairman), S. O. Smith, F. Thorne, F. Salter, P. Radford, A. Salter, W. Sibley, J. Vaughan, A. Sibley, A. Friend, and E. S. Matthews (Hon. Sec.).

**KATUNDA CONFERENCE.**—It was decided to unite with Kapunda Branch in holding conference of surrounding Branches about end of March.

**ECONOMIC ENTOMOLOGIST.**—Members were of opinion that the suggested appointment of an economic entomologist was not justified.

**ANNUAL REPORT.**—The Hon. Sec.'s annual report for year showed that eleven ordinary and three special meetings had been held, the average attendance being eleven. Papers on Spraying, Summer Fodders, Storing Apples, Lessons to be Learned from a Season of Drought, Wild Fruits of Cashmere, and Monthly Gardening Notes, had been read and discussed. Special attention had been paid, in co-operation with the Tanunda Branch, to the prevention of the spread of orchard pests.

### Tatiara, January 22.

Present—Messrs. G. Ferguson (Chairman), J. Rankine, R. Scown, Thos. Stanton, M. Whelan, W. Montague, D. Makin, E. Prescott, T. Hall, H. Killmier, F. Smith, and W. E. Fisher (Hon. Sec.).

**SOUTH-EASTERN CONFERENCE.**—It was decided that the Conference of South-Eastern Branches be held at Bordertown on Wednesday, March 16th, and a committee was appointed to make all necessary arrangements.

**MANURING.**—Mr. Montague tabled three samples of Purple Straw wheat, manured with Thomas' phosphate, guano, and English superphosphate respectively, the latter giving best result

### Minlaton, January 25.

Present—Messrs. J. Martin (Chairman), D. G. Teichelmann, M. Twartz, S. Vanstone, H. Boundy, J. Fletcher, J. H. Ford, and R. Higgins.

**FRAUDULENT MANURES.**—Mr. M. Twartz read some startling disclosures made in the Melbourne *Leader* of January 1, concerning "Rawson's" patent improved fertilisers, which had been advertised with analysis, showing value to be £6 9s 7d. per ton, but, upon being tested by the Government Agricultural Chemist, proved to be worth only 17s. 5d. per ton. The advertised price was £5 per ton. [A lengthy and highly laudatory advertisement stated that the "actual value, as computed by Professor Pearson, is £6 9s. 7d. net, without profit." The published analysis showed the manure to be very rich in phosphoric acid, potash, nitrogen, and carbonates. Professor Pearson denies that he ever gave such a computation, and after analysing samples purchased by the proprietors of the *Leader*, shows 00·95 per cent. nitrogen; 00·80 per cent. potash; and 2·30 per cent. phosphoric acid; sand, 38·50 per cent.; lime, 10·52 per cent.; and other rubbish abundant.—GEN. SEC.]

### Swan Reach, January 7.

Present—Messrs. P. A. Haase (Chairman), J. O. J. Kohnke, A. G. Zadow, B. Schwartz, P. A. Beck (Hon. Sec.), and one visitor.

Co-OPERATION—After a good discussion it was resolved to endeavor to establish a branch of the S.A. Farmers' Co-operative Union in the district, and the Hon. Sec. undertook to canvas the producers.

CROPS.—Crops were reported to have yielded as well as could have been expected considering the dry season. About 6·500in. of rain fell during the whole year.

### Forster, January 3.

Present—Messrs. A. Johns (Chairman), J. Sears, J. R. Bolt, F. Johns, and S. Plummer (Hon. Sec.).

OFFICERS.—Mr. S. Sears appointed Hon. Sec. in place of Mr. S. Plummer, who is leaving the district.

SEED WHEAT.—Several members consider Purple Straw to be best for main crop, with a little Steinwedel and Velvet Pearl to come in earlier. Mr. A. Johns thinks Dart's Imperial best. Decided to ascertain cost of New Zealand wheats delivered at Port Adelaide.

### Norton's Summit, January 22.

Present—Messrs. J. Jennings (Chairman), C. W. Giles, J. J. Bishop, J. Hank, J. Jennings, C. Jennings, A. Smith, J. Cowling, Thomas Playford, James Pellew, W. H. Osborne (Hon. Sec.), and five visitors.

SAN JOSE SCALE.—The Chairman read an extract from Bulletin No. 9, N.S., U.S.A. Dept. Agric., on "San Jose scale," showing that no means of extirpation had yet been discovered except total destruction of the orchard. In one instance, in Maryland, 13,000 trees were dead in an orchard of 300 acres, containing 28,311 trees. The scale attacked numerous plants, including the common milkweed (*Asclepias syriaca*), in great numbers. This pestiferous insect had been distributed from one nursery in New South Wales all over that colony, and was now found in Victoria. He urged the necessity of taking steps to secure prohibition of fruit importations. [There is even greater danger in introduction of plants.—GEN. SEC.] If this action had been taken sixteen years ago the codlin moth would not have been introduced. With the San Jose scale and Queensland fruit-fly in prospect, and codlin moth actually present, ruin was staring our fruitgrowers in the face.

### Balaklava, January 15.

Present—Messrs. C. L. Reuter (Chairman), J. Crawford, J. Mills, J. Willmott, E. Roberts, A. Steinwedel, A. Manley, W. H. Sires, and E. M. Sage (Hon. Sec.).

HARROWING GROWING CROPS.—Mr. Steinwedel said it had not been mentioned, in connection with the report from Nantawarra Branch on the experiments with drill and manures, that a part of Mr. Belling's drilled crop was harrowed in August, and that the part so treated was much cleaner than that which was not harrowed, although to the eye no difference was perceptible in the whole crop.

BUNT.—Mr. Reuter reported that last season he had sown well-pickled seed on dry soil, but the crop was much bunted. Mr. Sires considered that wheat



that had been at all damp in the heap or in bags was very liable to be smutty. Mr. Sage wished to know whether Bordeaux mixture would not be better than pure bluestone solution for pickling seed wheat; was it wise or otherwise to use lime for drying wheat after pickling with bluestone? [Lime in contact with the acid would naturally set up a strong reaction, so that the one would neutralise the other. Professor Custance condemned it unreservedly. It would be worth while to try Bordeaux mixture—winter strength—for pickling wheat, and if sugar were added it would probably be more effective, because the saccharate of lime would make the solution very much stronger.—GEN. SEC.]

**MANURES.**—Some discussion on the use of commercial fertilisers took place. Mr. Steinwedel advised applying guano in connection with fallowing operations, as, if used at seedtime, it did not give such good results, the phosphate not being readily soluble. Mr. Manley had used guano, but could see no benefit. Mr. Sage had no better return from use of Thomas phosphate, but on a row of wheat 32ft. long, manured with Adelaide Chemical Works superphosphate, he obtained 180zs. of clean grain, while from the next row, unmanured, only 40zs. were obtained. The land had no special preparation; it was worked last season, then the drills were cut out with a hoe, and the land between the rows hoed. The superphosphate was used at the rate of  $1\frac{1}{2}$  cwt. per acre. Superphosphate broadcasted in the paddocks had a marked effect.

### Pine Forest, January 11.

Present—Messrs. J. Phillis (Chairman), D. F. Kennedy, J. St. J. Mudge, A. Mudge, W. H. Jettner, F. Inghs, G. Zilm, J. J. Lewis, R. Barr. jun. (Hon. Sec.), and two visitors.

**ANNUAL REPORT.**—The Hon. Sec.'s annual report showed that during 1897 twelve meetings were held, with an average attendance of seven members. Nine of these meetings were held at members' homesteads, and were well attended by visitors. Papers upon Judging Horse Stock, Judging Implements by Points, and Homestead Meetings, were read and discussed, and many current topics of interest to producers dealt with. In conjunction with the Port Broughton and Mundoora Branches a very successful show of produce was held at Port Broughton. The rainfall for the year at Bews was 10·750in. Messrs. W. H. Jettner and R. Barr. jun. were elected Chairman and Hon. Sec., the officers for the past year being accorded a vote of thanks for their services.

**FERTILISERS WITH SEED.**—The Hon. Sec. tabled the following report concerning his experiment in mixing the seed wheat, after pickling, with fertilisers:—

Eight plots of seven acres each were sown on June 17 to 19, 40lbs. of wheat per acre being used. After pickling the wheat with bluestone, the fertiliser at the rate of 20lbs. per acre was mixed with the seed so as to give the grains a coating of fertiliser, and then broadcasted by hand. The following table shows fertilisers used and results—

Plot No. 1—	Treated with bone phosphate.	Result—669lbs. wheat.
“ 2	“ Thomas phosphate.	Result—975lbs. wheat.
“ 3	“ English superphosphate.	Result—1,115lbs. wheat.
“ 4	“ no manure.	Result—653lbs. wheat.
“ 5	“ mixture of bone phosphate and Thomas phosphate.	Result—1,182lbs. wheat.
“ 6	“ mixture of bone and superphosphate.	Result—1,037lbs. wheat.
“ 7	“ mixture of Thomas and superphosphate.	Result—1,237lbs. wheat.
“ 8	“ mixture of the three phosphates.	Result—1,258lbs. wheat.

Where the manures were mixed, equal quantities of each were used; with the exception of plot No. 1, which adjoined some scrub, and was injured to the extent of at least 100lbs. of grain by rabbits and other vermin, each plot had an equal chance. With the exception of No. 3 all the plots were badly bunted, and he inferred from this that superphosphate

has a beneficial effect as a preventive of the disease. In addition to these plots, he also put in 300 acres with seed treated the same way as plot 8, and according to the result of that plot the return should have averaged 3bush. per acre, but the actual return was a bushel less per acre. This may have been due to the dry working of the bulk of the land, the rains coming very late. Up to the end of August the whole crop promised equal to 6bush. to 8bush. per acre. The members must of course draw their own conclusions from these experiments, which were most carefully carried out, everything being weighed both out and in, and nothing left to guesswork with the danger of missing the main point. He mixed the three phosphates in equal quantities, as he found the super. stuck to the wheat best, and if kept sufficiently moist the other manures adhered to it better than to the wheat. His own opinion was that it will pay to use English superphosphate in this way on all land we cultivate after the middle of May, provided we are unable to make use of the drill. Using 20lbs. of manure, value 1s., and allowing another shilling for the extra labor, this makes the extra expense 2s. per acre, which, at an increase of only 1bush. per acre, will be doubly repaid.

Mr. KENNEDY said they were all much indebted to the Hon. Sec. for giving them the benefit of his very complete experiment, but he must warn them not to place too much reliance on the results of a single experiment or set of experiments. Mr. Barr's experiment seemed to bear out what a manure agent told him, viz., that superphosphate was to a certain extent a preventive of bunt, but against this was the fact that a crop near Moonta which had been manured with super. was almost rotten with the disease. Considerable discussion followed, and many diverse results from the use of commercial fertilisers were given.

CONFERENCE OF BRANCHES.—It was decided to invite the Branches at Arthurton, Balaklava, Bute, Crystal Brook, Dowlingville, Inkerman, Koolunga, Maitland, Mundoorra, Narridy, Kadina, Port Broughton, Port Pirie, Redhill, and Nantawarra to co-operate in holding a conference of Branches at Alford on Wednesday, March 23.

### Clarendon, January 20.

Present—Messrs. J. Wright (Chairman), A. Harper, J. Chapman, J. Juers, J. Spencer, H. Payne, W. Spencer, A. A. Harper, J. Piggott, and A. L. Morphett (Hon. Sec.).

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that during the past year eleven meetings were held, with an average attendance of over ten members, and several visitors. Owing to the dry season their experimental work had been a failure. Several papers have been read and discussed, and many practical matters dealt with. Mr. A. Harper was elected Chairman, and Mr. A. L. Morphett re-elected Hon. Sec. for ensuing year.

CROP REPORTS.—Several members took exception to the statements in the daily press concerning the crops of the districts. The hay average was given as 3 tons to the acre, and the potato crop as 8 tons; whereas, in the opinion of members, the crops mentioned did not average more than half these figures.

### Hahndorf, January 29.

Present—Messrs. G. Sandow (Chairman), H. Spoehr, H. Kerr, T. Grivell, M. C. Bom, C. Jaensch, J. C. Rundle, and D. J. Byard (Hon. Sec.).

BENEFICIAL INSECTS.—Mr. Grivell reported that the aphid blight on his trees had been completely cleared off by lady-birds.

VINE-GROWING.—Considerable discussion took place on the suitability of this district for vines, several favorable reports by Mr. Thomas Hardy and other vignerons being quoted. Mr. Sandow said he had Zante currants bearing well at Grunthal. Other members contended that the severe frosts experienced when the grapes are in bloom made vine-growing very precarious, the climatic conditions having altered, for the worse, in this direction of late years.

### Crystal Brook, January 15.

Present—Messrs. W. J. Venning (Chairman), J. C. Symons, A. Fergusson, George Davidson, J. Chambers, R. Pavy, E. Pope, Dr. A. H. Bennett, and George Miell (Hon. Sec.).

FIELD TRIAL.—In connection with a letter from Port Pirie Branch, it was decided to hold a field trial of seed drills and other tillage implements within half a mile of Crystal Brook on Wednesday, April 6, 1898, and to invite all manufacturers, merchants, and agents to exhibit.

### Lipson, January 22.

Present—Messrs. S. F. Potter (Chairman), W. Darling, T. G. Cosh, E. D. Swaffer, S. Burt, E. J. Barraud, H. Thorpe (Hon. Sec.), and three visitors.

EXPERIMENTS.—Several members reported failure of experiments with Bureau seed, the season being too dry.

BRANCH SHOW.—Owing to the failure of the fruit and vegetables, the produce show in connection with the Port Lincoln and Lipson Branches will not be held this year.

RABBITS.—Mr. Barraud reported having been advised by the Produce Export Department that rabbits weighing 2½ lbs. were worth 5d. to 6d. per pair at the dépôt, Port Adelaide.

EXCHANGE OF SEED.—It was decided to write to Boothby, Bute, Kadina, and Balaklava Branches, asking whether the members would exchange seed wheat with members of the Branch. Some members thought it better to endeavor to get seed from a drier district.

WORMS AND LAMPAS.—Members wished to know how to treat horses for these complaints. [For worms give a wineglassful of turps in a pint of raw linseed oil, followed by feed of damped pollard and an occasional bran-mash. For lampas the brutal plan of burning with hot iron used to be adopted by ignorant smiths and others. This had not the slightest beneficial effect, but, on the contrary, added to the sufferings of the horse. The proper thing to do is to feed on soft nutritious food until the inflammation subsides.—GEN. SEC.]

## METHODS OF USING PORTLAND CEMENT.

The South Australian Chamber of Manufactures having made inquiries of many experts in the building trades concerning the most successful methods of using Portland cement, and more especially that manufactured in South Australia, has published the following:—

“Cement should always be kept covered in a dry place; that is, free from any moisture, especially when it is in bags.

“When used in construction of brick and stone walls for tanks, cement should be mixed by measure in proportions of not more than 2½ of sand to 1 of cement; mixed in small quantities and used within a half to one hour, according to the temperature of the atmosphere. For ordinary brick and stone walling proportions of 4 of sand and 1 of cement may be used. The sand must be perfectly clean; that is, free from loam or decayed wood. When cement is used in a brick wall the bricks should be well wetted immediately before use, and if the weather be warm kept well wetted either with wet bags or by frequent hosing until the cement has properly set. Water for use in cement work should be clear and free from loam and other foreign matter. Clean salt water may be used if fresh be unobtainable. The walls of tanks above ground should be constructed of brick. Tank walls, if built of stone, should have no through stones, but alternately large and thin stones outside and in, or a stone wall bonded similar to a 14in. brick wall. It is not advisable to build walls for

tanks with stone of a slaty nature, and all tank walls should be well ground in with liquid mortar so as to fill in all interstices.

"When using cement for coating the face of a wall the same precautions must be observed in mixing, but the proportions should be 3 of sand to 1 of cement. The wall should be well wetted before applying the cement, and the work kept well wetted according to the temperature until it has properly set. When applied to brickwork the coating of cement should not be less than  $\frac{1}{2}$  in. in thickness, and when coarse sand is unobtainable the sand should be put through a fine sieve of not more than one-eighth mesh, and the coating brought to a smooth face in one operation by dusting with neat cement and well trowelling. When coarse sand only is obtainable the coating may be finished with a second coat mixed in equal proportions of sand and cement, the sand being clean washed of one-eighth mesh or under, and the previous coating, having been well scored on face, should be slightly wetted before the second coat is applied. When applied to stonework the joints, if of lime mortar, should be well raked out so as to form a good key and two-coat work applied as above.

"When using concrete for a floor the foundation should not be less than 4 in. in thickness. If gravel be used, it should be thoroughly clean and free from loam or other foreign matter, mixed by measure in the proportion of 5 parts gravel and sand to 1 of cement, well turned over three times dry, mixed stiff with as little water as possible, and again well turned over and raked, then laid to an even thickness, well rammed three times in quick succession, ruled true, well hand-floated up; then sprinkled over with equal proportions of fine sand and cement in a dry state, to take up moisture; again well hand-floated, and as soon as the face is hard enough, well ironed off with a laying trowel, and kept damp with wet bags for a few days, until thoroughly set. When forming floors with bricks the bricks should be laid with  $\frac{1}{2}$  in. joints; joints to be kept open, grouted in with 4 to 1 stuff, finished with at least  $\frac{1}{2}$  in. of 3 to 1 stuff, and faced up as stated for concrete floors. In laying cement floors, in no instance should lime be used in a concrete bed or the grouting in of a brick bed if best results are desired.

"When using cement at any time for coating the surface to be covered should be well wetted, and, if possible, in hot weather the coating should be applied after the sun has passed off for the day. The importance cannot be too strongly emphasized of using cement within an hour at most after mixing, and in no instance should it be used externally during hot winds. It is important also that cement should not be allowed to dry—that is, set—in less than three days. If allowed to dry quickly, say in six or eight hours, it will generally be found to have perished, and the fault will not be in the cement, although if not too far gone the work can sometimes be brought back again by systematic wetting for a few days."

The following methods of procedure had also been supplied by a vigneron, who had attained marked success in the construction of tanks above ground:—  
 "The wall is first well saturated, then proportions of one-third cement and two-thirds coarse clean river sand is made into a thin mixture, which is splashed on to the wall with a trowel to procure a rough surface. After about twelve hours the first coat of 2 of sand to 1 of cement is put on in the ordinary way and levelled. This coat is well scored on the face before it properly sets, and in another twenty-four hours a thin coat of neat cement is put on and polished hard and smooth with a glass float. During all these operations the wall is kept moist, no sunlight allowed to get to it, and, if possible, draught avoided, which precautions are observed for at least a week until this cement has properly set. The great secret of course is that a good tradesman will not mix more sand and cement than is necessary for his operation, will test every cask of cement before using (as one cask may set sooner than another), and mixes his quantities and works accordingly, and also exercises the main precaution of keeping his work well saturated until it is properly set."

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[A NEWS PAPER]

VOL. I.

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### NOTES AND COMMENTS.

During the early part of the month the drought over a large area of the Northern and North-Eastern pastoral districts broke up, fine soaking rains being experienced. The rain extended south to the Burra, and, while patchy, replenished the tanks and dams in many parts of the agricultural districts east of the Flinders Range. Light rains also fell on the 24th throughout the colony, but, except in a few cases, not sufficient to cause the water to run. The water question has become a very serious one in many parts of the Lower North and South, while north of Yorke Peninsula to Port Pirie there is practically a water famine. While good heavy rains would do much harm to the dry feed, it would save endless anxiety and expense to thousands of our farmers and stock-owners.

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The excessive hot weather experienced during the past month emphasizes the necessity for providing our stock with shelter, not only from the heat, but also from the wind and rain in winter. A few of our farmers and many suburban dairymen absolutely provide no shelter for their stock. To allow the animals to remain out in the sun with the temperature from 160° F. to 175° F. is downright cruelty, apart from the economic standpoint. Every stock-owner should consider it his duty to provide adequate shelter for his animals, either by tree-planting or building rough sheds, with the sides and roof of scrub or brush.

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There is very much to be learned from the Italians in regard to grading, curing, and wrapping and packing of lemons. These are snipped from the trees when they reach a certain size—about 2½ in. diameter—while the fruit is still green. They are cured on trays, where the surplus moisture in the peel is evaporated and the skin is toughened. They are then wrapped in tissue paper, printed with brilliant colors, and packed in cases, with a few of the top layer wrapped also in bright tinfoil. Amongst thousands of cases there will scarcely be found a bruised fruit, or one that differs in size, or any other particular from all the rest. But, after the cases reach the hands of some of our dealers, the fruit becomes bruised and decayed through the rough handling.

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A visit to any of the fruit auction rooms or to the markets will reveal some remarkable differences in the methods of packing, as well as in the prices realised for fruit which was on an even equality whilst growing on the trees.

Many growers appear to forget that the slightest pressure on the surface of a ripe peach, pear, apricot, &c., will develop a bruise within an hour to two, and a few even shake the fruit off the trees on to the ground. The result of this reckless treatment is apparent when the fruit reaches market, in the shape of numerous large blotches of rottenness. Many growers of such fruits now gather them with thick woollen gloves on the hands, cut them off with snippers, and, after wrapping each separately in a large green leaf, lay them in single layers in shallow trays. The difference in value between the latter sort and the former is as great as that between gold and copper.

Continued reports came to hand of the comparative failure of the apple crop in America. In many counties of the United States there is no surplus for export, and it is estimated that Nova Scotia, which last year exported 400,000 barrels, will this year have only 75,000 barrels. The crop is the lightest for many years. South Australian growers should take advantage of the prospects of high prices being obtainable in London this year. Even though our crop is small, and prices good, the export of a few thousand cases will raise the local price, and return probably more than obtainable here. Besides this, it is important that we should keep our apples before the London buyers.

The introduction into New South Wales of fruit or plants affected by codlin moth caterpillars, scales, and other insects is prohibited, under the Vegetation Diseases Act of New South Wales, and the Sydney Department of Agriculture intimates that the regulations will be strictly enforced.

By proclamation under the Vegetation Diseases Act of 1896, the introduction into Victoria of nursery stock, plants, &c., is allowed only subject to inspection by officers of the Board. If it is considered necessary the plants are removed to the Burnley Horticultural Gardens, and there fumigated at the expense of the importers.

A correspondent of the *Australasian*, Mr. C. M. Bastow, of Gnarwyn, Harcourt, has been successful in ridding his trees of what is known as the Rutherglen fly pest (*Rhyparochromus* sp., or false chinch bug) by spraying with bi-sulphide of carbon, prepared as follows:—Dissolve 4ozs. carbonate of soda in 30galls. of water, then mix 5qts. bisulphide of carbon and 5qts. raw linseed oil; pour this mixture into the soda-water, and churn well; it should be used as soon after mixing as possible. No harm will be done to the foliage, and it will be found to be as effective and much cheaper than the benzole, which is commonly used.

The codlin moth is not great as a traveller on its own account; but is carried everywhere by careless and unscrupulous human beings. This being the case, every grower of apples and pears may greatly decrease the number of his enemies by trapping the caterpillars in bandages placed around the trunks of his trees, in crumpled-up pieces of paper placed in the forks of the branches, and by destroying all attacked or fallen fruit. Some growers have kept count of the caterpillars thus taken, and make record of several thousands. Each

one of these so taken has destroyed at least one apple or pear, and nearly the whole of this loss might have been prevented had the trees been sprayed three or four times, at intervals of twelve days, with Paris green mixture, commencing directly the petals (or leaves) had fallen from the flowers.

The extremely dangerous practice of poisoning bird-pecked fruit with strychnine has been adopted and recommended by Mr. John Williamson, of Sanden, Victoria. He picked apples and pears that had been bitten by parrots, scooped out the rotten, damaged part, stuck wire through the rest, mixed 1oz. strychnine with 4ozs. icing sugar, and spread a very small quantity of this on the cut surfaces of the fruit, which he hung up in the trees. Under one pear tree so treated, between daylight and 9 a.m., he says he picked up fifty-one Green Swifts, twelve Blue Mountain parrots, and a few others scattered about. Some day people who follow his example will find a few children and a number of fowls and other pets lying dead beneath the fruit trees; and the question will then be tried whether the act was culpable homicide or wilful murder.

Growers of fruit in the suburbs are much annoyed by men and boys stealing their fruit at all times by night and by day—"wholesale and retail." To prevent this to some extent it is necessary to establish thick thorny hedges. One of the best of plants for this purpose is the African box-thorn (*Lycium horridum*). Directly the plants are long enough, they should be plaited one with the other, bringing them down horizontally. This plaiting must be done by hand, wearing thick leather gloves, and be continued until the hedge is 6ft. high. If properly done, a cat cannot get through.

Some Chinese gardeners have started growing tobacco on the Black Swamp, not far from Nangkita Village Settlement, and have an excellent stand of plants. They will have a good quantity of leaf for sale, provided no disaster overtakes it during the process of drying.

Osiers do not grow well on swampy land, but require a deep, loamy, sandy soil, fairly rich, and with plenty of moisture in it. Cuttings or setts should be planted 3ft. apart each way in regular lines. The best time to plant is at the end of autumn, and a first crop of osiers may be cut the following year—about June or July. Cuttings should be 9in. to 12in. long, and the stumps of the trees should be left 1ft. above ground. About the third or fourth year the full crops of canes can be harvested. About 1 ton to 2 tons of dressed osiers per acre would be a fair crop. For this 6 to 7 tons of green rods would have to be carted off the ground. For strong, coarse baskets the stone willow is much valued.

If the chicken cholera virus should prove to be as effective as is hoped in destroying the rabbits which swarm over the whole of Australasia, there will be a stop placed upon the export of frozen rabbits to England, and many hundreds of trappers, carters, and others will be thrown out of employment. The question may well be considered whether it is not possible and desirable to breed rabbits in certain suitable localities, where the diseased rabbits can be kept out by wire netting or other devices.

One of the most neglected branches of farm work is book-keeping. Probably many of our farmers consider this unnecessary work, but in this they are greatly mistaken. Unless a record is kept of the returns and expenses of the different crops raised on the farm, it is impossible for the farmer to know for a certainty whether any branch of his work is profitable, and unless he knows this, it is evident that he cannot make the best use of his opportunities. An elaborate set of books is not necessary, but a simple record of the outgoings and incomings, placed under separate heads, should be kept by every cultivator. In these days of free and compulsory education there should be no difficulty in carrying out this work, as, where the elders cannot do it, the boys and girls should be able to help.

Of late years the agricultural press of Australasia has had little to say about the importance of subsoiling, but there is very great advantage to be derived from the practice when the natural conditions of the soil warrant it being adopted. The top soil should first be turned over to a depth of 4in. to 9in., according to its character, taking the greatest care to avoid covering it with the crude poor subsoil. Then run a plough, without its breast or mould board, along the same furrow, to break up the under soil *as finely as possible*. If the subsoil is laid up in clods it will do more harm than good, as it will make the whole seed-bed "as dry as a lime bag." In mallee lands it would possibly prove beneficial if the loose rubble beneath the upper soil could be somewhat compacted, as it is generally *too* loose and open. A certain amount of air is necessary about the roots of plants, and in nature this is provided for by worms, &c., and in forests by the swaying about of trees, which loosens up the soil around the roots. The feeding roots of most plants rise to the surface in search of the humus and other decaying organic and mineral matters which are naturally deposited there, and the water roots and anchor roots penetrate the lower depths in search of moisture, &c. By loosening the soil these operations are greatly facilitated, and the luxuriant progress of the plants and trees is greatly facilitated.

Except in the rotting or destruction of seeds of weeds, there is nothing to gain, but much to lose, in the "making" of farmyard manure. First, there is the labor lost in carting in and out, the labor in turning and making; then there is the loss in weight, and the dissipation of nitrogenous matter through fermentation, oxidation, and volatilisation. All of this loss could be avoided by carrying and spreading the manure at once upon the land. If this cannot be done, then the manure should be liberally sprinkled with pulverised or calcined gypsum, which will "annex" the ammonia and, prevent its escape, will prevent all bad odors, and will make the fertiliser at least 50 per cent. more valuable than when it has been allowed to become heated and fermented.

**MAMMOTH BLACKBERRY.**—Judge J. J. Logan, who originated the famous "Logan Berry," has now succeeded in producing a cross between the wild Californian blackberry (*Rubus ursinus*) and the Texas Early. Both parents produce medium-sized berries, but the cross produces berries 2½in. long, of excellent flavor. The new plant will not propagate by sprouts nor by root-cuttings, but the canes, which run 25ft. to 30ft., strike roots at their ends. This new variety has not yet been tried outside its original locality. It is a very good cooking and canning berry.



## SALTBUSH.

The prolonged drought experienced in the northern farming and pastoral districts of South Australia has caused landholders to seriously consider the question of protecting and replanting the indigenous fodder plants, more especially the saltbushes. As it is a difficult matter for the individual farmer to get seeds of such plants collected, the Agricultural Bureau has obtained a quantity of seed of some of the best of the perennial saltbushes, as well as of Mitchell and other valuable grasses, and will forward seed of each to anyone desirous of raising a few plants. A stamped envelope should be enclosed with application.

Saltbush seed should be sown while the ground is warm, either in the autumn or in spring. From March to May will probably give most satisfactory results. Seed should be sown in prepared beds, kept moist, and the plants set out in the early spring at about 6ft. apart. Once a few plants are established, they can be rapidly multiplied by means of cuttings.

## HINTS TO AMATEUR IRRIGATIONISTS.

BY J. MCINTOSH, VILLAGE SETTLEMENTS EXPERT.

Horticulture with the aid of irrigation is undoubtedly one of the most profitable and interesting pursuits that a person can enter into, provided he has a common-sense idea of what to do, when to do it, and follows the business on practical and economical lines. With a fair soil, a knowledge of what is suitable to plant, a liberal supply of fresh water, and a good general idea of how to use and distribute it, success is assured. The application of water to the soil is one of the most important factors of the whole, for as much damage can be done to the trees and plants by its injudicious use as without its use at all—particularly where there is bad drainage. Light watering with sprays, and simply running the water over the top soil for a few minutes—on any soil—is one of the most common mistakes, as it encourages the rootlets to the surface in quest of the moisture, which the summer sun soon draws off and heats the soil to such an extent that it wilts the top roots and rootlets and in consequence the whole tree suffers.

To derive the best results from irrigation it is essential that a proper system of both channeling and distribution should be in use. With systematic channels, &c., one person can utilise to the best advantage at least five times as much water as he could do on the rough primitive style usually to be met with outside of irrigation colonies, and at the same time derive pleasure from his work; whereas the person who starts the water running on to the ground, and then has to make immediate provision for its distribution, usually considers that the man who said "irrigation is child's play" was a lineal descendant of a certain biblical character of doubtful repute. With a first-class system one man can handle a stream of 200 miner's inches, equivalent to 2,700,000 galls. per day, with considerable more ease than he could a 40in. stream under the system usually met with.

The main channel or head ditch, as the case may be, must start from the highest water level, and run from thence in the best position to command the whole of the land intended to be irrigated. For a five to ten acre lot the ditch from the head water should be without concrete, 3ft. 6in. wide on top by 12in. wide in bottom, and 12in. deep, constructed one-half depth above and the other 6in. excavated below the natural even surface; channel banks 18in. wide on top, with a 2 to 1 slope (outside.) To find the fall per chain, which should be about an inch

starting from the higher point, take three common levelling rods 3ft. long, with 6in. tee pieces on top, and an ordinary spirit-level, with which you can find the true level approximately, and then drive a peg in at the end of the first chain lin. below the true level line; shift the first two rods and get your true level again from the third rod, then proceed as before.

Outlets for irrigating should be placed along the ditch every 8ft. These must be carefully put in flush with the bed of the ditch (see sketch), for the irrigating furrows ought to be 4in. deep, which necessitates the water rising from the mouth of the sluice or outlet instead of falling, thus preventing any wash; the pressure of water behind will give the necessary force required. The outlets can be made from any sound lumber. Width for tops and bottoms, 2in. by 1in.; sides, 4in. by 1in., giving an aperture of 2in. by 2in., and 4ft. 6in. long, nailed together with 2in. wire nails. End of outlet in ditch sawn off at a 1 to 1 slope. Cover same with a common tin slide for regulating the flow of water, after which it is advisable to give it a coat of coal tar before putting it into the ground, when it will last for an indefinite time. Cost, about 9d. each.

Place water gates in channel every four chains apart. These can be easily made by taking four pieces of inch board, and nailing them together with the centre one  $\frac{3}{4}$ in. from flush with the edge. The middle board can be any width, the wider the better, but the outside ones do not require to be more than 2 $\frac{1}{2}$ in. wide. Saw the whole into lengths of 14in., and with a piece of lumber 2in. x 2in. for a sill make a gate 2ft. wide x 12in. high, letting the extra 2in. into the bed of the ditch, with the sill for the "drop" to rest upon. Fix carefully into the banks, making wings out of any old lumber or sheet iron lying around.

To regulate the stream of water or stop its flow, use three pieces of inch board — a 6in., a 4in., and a 2in.—which can be simply dropped into the door or gateway as required (see sketch). Should 6in. of water be required in the first section, take out the remaining two boards, when any excess of water has a safe get away into the second section.

To distribute the water from the main outlets into the respective irrigation furrows, supposing you have a row of plants every 4ft. apart, take a piece of lumber (sawn) 10ft. long x 1in. thick x 6in. deep, and cut overflow outlets every 2ft., same to be 3in. deep x 1in. wide. Place the board in the distributing furrow opposite the outlet and perfectly level, when the water will regulate itself, provided that the board is properly tamped round with earth to prevent any leakage.

The grade of the land should not exceed 3in. fall in the chain from the head ditch towards the lowest point, and, although this may seem out of the question, it can always be done either by water at an angle or on the contour. Run the water in small streams until such a time as you find it takes to thoroughly soak the soil. (The ordinary sandy loam usually takes a sufficient supply for tree or vine irrigation in from twelve to twenty-four hours.) Constant and thorough cultivation will assist the water materially. There is one variety of light soil which is almost impervious to water, viz., the mounds whereon the large eucalypti have grown in mallee country. Land of this nature requires deep ploughing and grading, to mix and break up the oily humus deposited by the original trees.

Be careful to cultivate as soon after irrigation as possible, to a depth of not less than 2 $\frac{1}{2}$ in., and also hoe the soil immediately around the young trees or vines.

In conclusion, I would advise all amateurs to remember the following facts:—

1. Cultivation is almost as essential as water in this thirsty land of ours; therefore cultivate well and often.
2. The more cultivation the less water required.
3. Irrigating furrows should not exceed 3in. in depth.

4. At every different irrigation try and run your furrows in different places, *i.e.*, first watering (young plants) 6in. away, second watering 9in., third watering 12in., and fourth watering 7in.

5. Do not let the water lie around the stems of the plants.

6. Keep small streams running, and as many as possible.

7. Do not over-irrigate. One good soaking per month is quite sufficient for any trees or vines.

8. Never water trees or vines when in blossom, or until the fruit has properly set

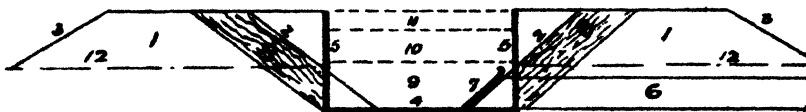
9. If possible do all your irrigation during cloudy days or at night during the summer. Water applied when the sand is hot and the sun at a high temperature often scalds the young roots and rootlets nearest the surface.

10. Make sure no weeds are allowed to grow around your plants, let alone go to seed, for remember that water is a good distributor of seeds, besides giving them a good start in life.

11. When manuring, see that the manure is properly wetted before it comes in contact with the young rootlets.

12. Use your own common sense throughout the whole business, when a certain amount of success will be assured.

*Sketch, showing Formation of Channel, Water Gate, and Irrigation Sluice in Position.*



1. Banks of ditch. 2. Inside slope of bank. 3. Outside slope of bank. 4. Bottom of ditch, and water gate sill. 5. Uprights with slots for stop boards. 6. Irrigation sluice, as fixed in place. 7. Slide over opening into sluice, for regulating the flow of water. 8. Guards of timber for gate, let into ditch banks. 9. 6in. removable stop board. 10. 4in. ditto. 11. 2in. ditto. 12. Surface level of soil.

Space at top between gate uprights (5) and bank (2) is closed by means of wood or iron.

## HOUSEHOLD HINTS.

**DRYING RAISINS.**—Except in localities which are very dry, and where the autumn is lengthened, it is not safe to depend upon the sun for drying—especially for “layers” or table raisins. The drying of cooking raisins can be considerably hastened by dipping in a caustic lye solution. For the dip, use 1lb. Greenbank’s concentrated lye, 98 per cent. in 8galls. of water. Raise the temperature to 108° F. or 110° F. Place the bunches in a wire-net basket, and immerse three to four seconds only. Then place the bunches on trays 5ft. x 2ft., not more than 10lbs. to 12lbs. on each, and at once expose to the sun. Do not dip later than 2 p.m., so that the grapes may be dried from the dip before the sun goes down. If dew or rain threaten pile the trays and cover with a cloth. Raisins should be turned each second day at least. When just dry enough not to give out moisture when squeezed, the raisins should be placed in bulk in a moth-proof room to sweat or “even up.” If they could be subjected to a dry temperature of 180° F. for five minutes before being sweated all eggs, &c., of moths would be destroyed.

**UNFERMENTED WINE.**—The name “wine” is wrongly applied to the juices of fruits which have not been fermented; but it is customary to use the term, and objection might be taken to “pure fruit juice,” which would be more appropriate. The juices of any kinds of fruit can be preserved for any reasonable time by a very simple process, and will be found to be far more nourishing and wholesome than those which have been fermented. First press out the

juice of any fruit, separating it completely from the skins and seeds; then submit it to a heat of 180° F. (never higher than 190° F., nor lower than 175° F.). Next, filter it through a conical flannel bag to extract the coagulated albumen and other flocculent matter. Finally, place in bottles, put these in a boiler of cold water up to the necks, bring the water to a temperature of 200° F., close as can be—but never boiling—keep at that for fifteen minutes; then cork and seal at once, before cooling.

**GRAPE JELLY.**—Strip and stem the large ripe berries, stir with wooden spatula in glazed pan until berries burst and juice flows freely. Strain off without pressure, pass through jelly-bag or twice-folded muslin, then rapidly boil for fifteen to twenty minutes; draw from fire; stir in (dissolved) 14ozs. clear sugar for each pound of juice. Boil the jelly fifteen minutes longer, stirring constantly, and keep it well skimmed. If black grapes are used, the jelly will be pale rose color, very clear. The Frontignac grape makes a very superior jelly, and is sometimes mixed with muscatels.

**TOMATO CATSUP.**—Wash the fruit and cut up; cook till soft; press through a coarse sieve. To each gallon of pulp add four tablespoonfuls salt, one pint vinegar, four tablespoonfuls ground pepper, half teaspoonful cloves, three tablespoonfuls ground mustard, half teaspoonful cayenne pepper. Boil slowly four hours.

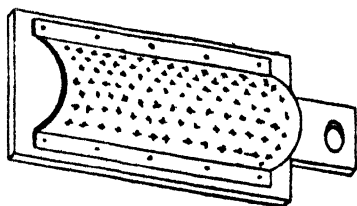
**CAUSTIC SODA SOAP.**—Dissolve a 2lb. tin of best caustic soda in 3qts. of cold water in a jar or other vessel, stirring till dissolved. It will become hot, but must be allowed to cool down to 70° F. for use. Melt 13lbs. of clean fat, free from salt, and when just warm, and still fluid, pour the cooled lye into the grease in a very thin stream, stirring all the time with a flat stick; This should occupy about two minutes. Pour the mixture into a mould, cover with a blanket, and put in a warm place till next day. Then turn out the cake of soap, and cut it into blocks by aid of a piece of whipcord or copper wire, tied at each end to short pieces of wood about the size of gimlet handles.

**HEAP PAINTS.**—For wood, iron, or stone walls, a very cheap and fairly lasting paint can be made by slacking fresh lime with just enough water, then sift it and stir into skim milk until it is thin enough to apply with a large brush; add a little salt and some ochre or umber, or some copperas. If required to be very white add instead a little washing blue. Another cheap paint is made as follows:—Boil 1pt. of whole linseed for half an hour in 12qts. of soft water; remove from the fire and add sufficient water to make 4galls.; let it stand to settle, draw off the water, and add enough whiting to make a thick whitewash; then add ½pt. of linseed oil, which is first emulsified by shaking it up in a bottle with carbonate of soda until it becomes yellowish-white in color. After the mixture has been thoroughly stirred it is ready for use. Another cheap paint can be made by mixing 4lbs. whiting with enough skim milk to allow of application with a brush, stir in at once 1pt. of linseed oil, and let stand twenty-four hours before use, stirring three or four times meanwhile. Any coloring may be added.

## SOMETHING FOR THE BETTER HALF.

There is a true saying extant that "A woman's work is never ended," and this, unfortunately, is very true in respect to the farmer's wife in many cases. From dawn till dark and far into the night she has a ceaseless round of duties to perform, especially when there is a family also to "do for." Occasionally (in distant countries, of course), the "good man" thinks his helpmeet has an easy time of it, and never requires rest or recreation. The farm must be kept provided with the latest improved riding-ploughs and other labor-saving

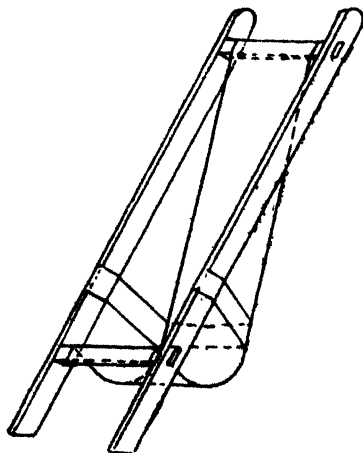
implements, &c., and the farmer himself must attend the markets, sales, and all sorts of functions, dressed in his best clothes, in order to keep abreast of the times, whilst his wife stops at home and wrestles with her work, wearing out her old gowns, and using the ancient and nearly obsolete utensils, appliances, and conveniences that were left by her great-grandmother. The South Australian farmer is not the sort of man to treat his wife in this way. He remembers always the early days when she was single, when he took her away from her comfortable home and her many loving friends, with an honest determination to make her new home even more attractive. But times have not been as prosperous as he could have wished, and he has not been able to purchase all of the household helps and conveniences that he would have liked; but he exercises his ingenuity, and manufactures from the substances that would otherwise have gone to waste such substitutes as will at least temporarily supply the requirements of his industrious wife. Perhaps the old bread-grater has worn out; and he gets a kerosene can, a square-pointed punch, and a piece of board, and turns out an article like this—



Smaller and finer graters may be made for nutmegs and other articles

Perhaps the goodwife wants a few strainers. These can be made from used cans, such as tinned meats, fish, fruit, &c. The holes should be punched from the inside, and the ragged points made in punching the holes should be rubbed off with a rasp or file. A good pepper-box can be made from a very small can by punching the holes with a bodkin or machine needle fixed in a piece of hard wood for handle. Mustard tins, largest size, make good flour dredgers.

When the weather is warm, a comfortable seat in the verandah is a luxury which can be easily provided. The illustration shows a bush easy chair or lounge to lean against the wall.



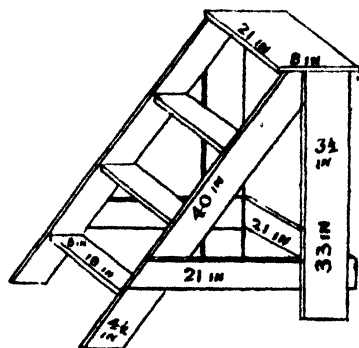
The picture shows how this is made. The wood need not be sawn stuff from the timber yard, but may be selected from the heap of firewood, or cut from

the pinery, if there is one near enough. The backing may be cut from an old wool bale, or may be a wheat bag or flour sack opened out. It is well to put a band at the back, as shown, to support the weight, and if another is placed a little higher up it will rest the elbows, and perhaps the head, if the sitter should fall asleep. A soft cushion may or may not be used in addition.

The editor of the *Journal of Agriculture and Industry* will be glad to receive descriptions and illustrations of utilised waste substances, home-made conveniences, and the like, for publication if necessary or desirable.

## HANDY STEPS FOR THE ORCHARD.

In a well-managed orchard there should be no necessity for a ladder when pruning the trees or gathering the fruit. At the worst, the highest branches should be within reach from the top of a three-step arrangement such as is here illustrated. The top part would be convenient for placing the basket or the pruning tools upon. The steps may be made with boards from old packing cases. The ends of the steps may be morticed in two holes at each end, or, if that is too difficult a job for the amateur, he may screw on two narrow slats for the ends to rest upon, and then screw the ends on to the side pieces.



These steps will be quite heavy enough for a man to lift about; but still they will be a great convenience.

## POULTRY.

BY D. F. LAURIE.

What progress are we making in the poultry industry? This question is often put to me, but as I am now not travelling through the country I cannot give an exact answer. It is, however, certain that a very considerable number of excellent birds, for all purposes, are now being bred, compared with was the case three years ago. Still there is not the improvement in quality of the general run of poultry marketed that one would like to see. A few lectures were given, and I have also answered some hundreds of letters, giving general information; still the average producer has not yet grasped the fact that a considerable improvement in stock is necessary before one may look for profit. Having been closely connected with country life from my infancy, I know of the prejudice against innovations; but at the same time having had much practical experience and opportunities of noting that of others, and also the benefit of conversations with many prominent breeders in other colonies, it

only brings forward to my mind more and more the necessity of improvement all round. I hear of no poultry leaving our ports, and yet I am informed that the Sydney Department has just completed a shipment of 10,000 head of poultry for South Africa, and some time ago the Victorians had almost a monopoly of the West Australian trade. It seems as if some heavy weight retarded the poultry industry here. In a former contribution I hinted at combination. I will now boldly state that any active man with a good head on his shoulders can soon make a fortune in the poultry trade, and at the same time add greatly to the prosperity of the producer. A certain amount of cash is certainly required. The method would be to collect the birds and eggs, and, having graded them, take care that only the best and most suitable, well-fatted birds go forward for the English market. The next quality, that is, large young birds, will be suitable for South Africa and West Australia, and the worst will do for our local bargain-hunters. As, however, all birds will be paid for with due regard to quality, the inferior sorts will soon be found unprofitable to breed. Eggs could also be dealt with in a similar manner. Such an enterprising person could easily make arrangements with breeders to supply him with eggs of breeds and crosses suitable for hatching. These eggs he could supply to his customers, with the result that the quality of his next year's stock would be very high. It is by no means necessary to procure Crystal Palace winners for this purpose. Good specimens of the right breeds can be purchased cheaply. They may have a few points against them as regards show standard, and yet retain the merits of the breed. As such birds are not to be bred from year after year it does not matter, as more or less new blood will be introduced each year. Poultry can be bred at a profit in most parts of South Australia. For either producing table-bird breeders or egg-layers, it is only a question of selecting twenty or thirty of the best young hens on a farm and mating them with pure-bred cockerels, which can be obtained for about £1 each. The following year the best of the improved pullets can be mated with male birds of another strain, or, if need be, of a different breed. By this means, as will be shown, a most valuable lot of poultry can be bred.

If it is desired to establish a strain of birds for producing high-class table birds, select large fine-boned, long-breasted, deep-keeled, clean-legged hens; those with white flesh, skin, and legs are the best; for each six or eight hens provide say Dorking cockerels about ten to eighteen months old. The following year these can again be bred from, and, in addition, a fresh lot of the best cross-breeds can be mated with either pure Dorking cockerels of another strain, or some other breed may be introduced. For instance, a cockerel of either the Houdan or Indian Game breed will improve the quality for table purposes, and next year the progeny may be mated with one of the three again. In a few seasons, by careful selection, only breeding from the best, a strain of birds will be produced that is not to be excelled for table-bird breeders. All birds which prove to be inferior should be discarded. With ducks the same methods are suggested. Select the largest white common ducks and mate with a Pekin or Aylesbury drake for each three or four ducks. Do not in-breed; have fresh blood each year, and have it good. Indian Runner ducks are small, but they are, as a rule, wonderful layers; the progeny of any breed of duck mated with Indian Runner drakes will be superior as layers, so this cross is to be recommended on that account. In addition, the quality of the flesh is excellent. With geese, select the largest common geese obtainable, not less than two years old, and mate with large pure-bred Toulouse ganders, and procure a fresh lot of ganders next year for the young stock; these, however, should not be bred from till two seasons old. With turkeys use pure American Bronze cocks mated with large common hens; do not breed from birds under two years old. It will be seen that with a little management after the second year the common

stock originally bred from can be discarded, and only improved birds bred from. As even when breeding on a large scale a large number of stock birds will not be required, it will be very easy, by branding the progeny of the different crosses and pens, to so manage as to seldom require to purchase fresh blood. Do not breed from rubbish, only from the very best. In forwarding birds either to market, or for shipment send only tip-top, fat, young birds, under six months of age. Let each crate contain birds of the same size and quality; do not risk the sale of the good ones by putting in a scraggy weed or two, or an old hen. If such must be sold send them separately; but of course, if for export, such birds would be rejected. This is a very important matter, and deserves due attention. However, as some people will never take the necessary trouble in this direction, it may be pointed out that considerable profit might be made by the poultry collector in purchasing birds of the proper description but in poor condition, and fattening them well before sale or shipment. It is a mystery to me why no one embarks in the egg trade with England. Eggs have been successfully shipped; in one instance the head of a well-known Adelaide firm informed me that the profits were 100 per cent. In all cases the eggs should be sorted into white and colored, and then carefully graded: it is hardly necessary to add that they must be perfectly fresh for shipping. If people knew that at regular intervals they could dispose of their eggs to a collector, there would be little trouble in inducing them to supply infertile eggs. I have often pointed out that it is waste of money to have a lot of useless male birds running about. To keep up the numbers it is far better to have a few pens of the very best birds on the farm for breeders. Spare male birds required for stock should be in a yard to themselves, or be kept at a considerable distance from the hens. A point worth mentioning is the necessity of carefully washing all stained or dirty eggs.

As regards laying fowls, a first-class strain can only be founded by careful selection. Breed only from those hens which are known to be good layers, and mate them with pure-bred Minorca or Leghorn cockerels, bred also from good layers. Minorcas lay large white eggs, and rank at the head of all the laying breeds, so if care is exercised in selecting the stock, the more Minorca blood it contains the better. There are, of course, good and bad layers of every breed, and, as like produces like, it will be found that the rule applies especially to the laying powers of a breed. Never feed breeding stock on stimulating food; such a course affects the constitution of the young stock. To promote laying give sound grain, occasionally a little soft food, house scraps, and also a little raw meat, but no spices and pepper. Green bone (uncooked) well crushed, at the rate of an ounce per hen twice a week, is highly recommended for laying hens, but for breeding stock too much should not be given. When breeding from stock of known quality, constitution is of first importance; were this matter better attended to we should hear less of poultry diseases and failures.

## BONES FOR MANURE.

In reply to an *Australasian* correspondent's inquiries, Mr. A. N. Pearson, the Victorian Agricultural Chemist, furnishes the following information concerning the utilisation of bones for manure:—

Bones in country districts, where crushing mills are not available, may be reduced by means of caustic lye, quicklime, or freshly-calcined wood ashes.

A simple plan is to pack the bones layer by layer with freshly-burned wood ashes in a barrel, and keep the mixture moistened for some months. Casks may be kept in constant use for this purpose on a farm, receiving every few days a fresh layer of bones and of ashes.

A quicker method is to boil the bones in an iron or copper boiler together with strong caustic lye. The proportions of bones and lye to be used are not exact or



invariable. Roughly speaking, five parts by weight of caustic soda, or seven parts by weight of caustic potash, dissolved in fifteen parts by weight of water, should disintegrate about fifteen parts by weight of bones by two or three hours' boiling.

If the bones be allowed to remain in the caustic liquor, even without boiling, they will, in the course of a week or so become disintegrated.

Another method of softening bones is by mixing in heaps with quicklime and loam. A layer of loam 4in. deep is made, and on this is placed a layer, about 6in. deep, of bones, and above this a layer 3in. deep of quicklime. The layers of loam, bones, and lime are repeated in succession until the heap reaches a convenient height, when it is finally covered with a thick layer of earth. Holes are then bored in the heap from the top, and water poured down them to slake the lime. The mass will become hot, and remain so for two or three months, after which the bones will be friable, and the whole heap may be mixed up, and is ready for the ground.

The making of superphosphate of lime by the cultivator on his own ground (says the *New Zealand Times*) is very easy, but it requires exceeding great care in the handling of the sulphuric acid, which will destroy everything it touches, and no metal tools in the shape of a stirrer or spade must be used. The proportion of acid is 50lbs., mixed with  $3\frac{1}{2}$  galls. of water, to 150lbs. of  $\frac{1}{2}$ in. bone-dust; or, if the acid is of considerable strength—say, 1.70 specific gravity—10lbs. to the bushel of bones (56lbs.) will be sufficient. The way to proceed is to form a pit in the ground proportionate to the quantity to be made: into this put the bones well wetted and saturated with their own weight of water, and stir the whole thoroughly up. Now add the acid (be very careful that it does not splash on to your hands or clothes or face), and the whole mass will begin to effervesce, boil up, and become warm, the sulphuric acid taking away two-thirds of the lime of the bone from the phosphoric acid, which remains united with the other third, forming a superphosphate of lime. This new substance being soluble in water is directly absorbed by the roots of plants.

## LIVE STOCK.

### NOTES FROM BRITISH PUBLICATIONS.

DISEASES IN STOCK IN GREAT BRITAIN.—From the returns published by the Board of Agriculture, the following outbreaks of disease and of animals slaughtered during fifty-two weeks in 1897 is noted and compared with the 1896 returns:—Anthrax, 434 outbreaks and 883 animals attacked; 1896—488 outbreaks and 904 animals attacked. Glanders (including farcy), 905 outbreaks, 1,577 horses attacked: 1896—817 outbreaks, 1,294 horses attacked. Pleuro-pneumonia, 7 outbreaks, 46 cattle diseased and 741 exposed to infection—all slaughtered; against 2 outbreaks, with 9 diseased cattle and 183 exposed to infection slaughtered in 1896. Rabies, 154 cases of dogs being attacked and 16 other animals; 1896—438 dogs and 22 other animals; the muzzling orders in 1897 having evidently been effective in 1897. Whilst of swine fever, 2,155 outbreaks and 40,432 swine diseased or exposed to infection were slaughtered; against 5,166 outbreaks and 79,586 swine diseased and exposed to infection slaughtered in 1896.

Scab is but poorly looked after, as there were 454 fresh outbreaks in fifty-two counties in Great Britain in the month of December, 1897, alone.

The Scottish Chamber of Agriculture has drawn up a memorandum on the subject of tuberculosis. It is suggested that a more uniform and thorough system of inspection of animals for slaughter, carcasses and dead meat should be made compulsory, and that all inspectors should be properly qualified veterinary

surgeons The following proposals are also made :—" That tuberculosis should be scheduled under the Diseases of Animals Act, and compensation paid to the owner where the carcasses of apparently healthy animals are condemned as affected with that disease. That all dairy cows should be periodically inspected by a veterinary surgeon appointed by the Board of Agriculture. That milk should not be allowed to be sold from piners or from cows with tubercular udders, but that the owner should be allowed to call in a veterinary surgeon and have the tuberculin test applied where he disputes the case.—*Live Stock Journal*.

## THE DAIRY.

### Hints for Judges at Dairy Shows.

The points to be considered in judging butter are flavor, aroma, grain, body, color, salt, package, and packing, to each of which the ideal of perfection should be awarded 100 points, equal to 800 total points. *Flavor* is the most desired item, and is the most difficult to secure. Taste alone can determine this question. *Aroma* is settled by smelling, and a keen perceptive faculty for odors is such to be desired in judges of butter. *Grain* is ruled by the amount of moisture held in the mass. It is "brittleness." *Body* is solidity or texture of the granules, and is found by the general feeling of the butter. *Color* is ruled by shade and evenness, absence of streakiness, &c., and is determined by sight. *Salt* is determined by its quality, quantity, and even distribution throughout the mass. *Package*.—This refers to the style and neatness of the package containing the butter when put up in bulk, or to the make-up when in rolls or otherwise. *Packing* is the "finish" of the butter on top when in bulk, and the solidity with which it is pressed into the package.

The temperature of the room in which the judging is conducted should be as near as can be to 60° F. The tryers *must* be very clean, and forced to the bottom of the package, turned half round, and withdrawn full of butter. Look at the back of the tryer to see if the butter cuts clean, and if the brine is clear. Draw the tester along under your nose, and note if it has a quick snappy odor. Run the thumb-nail along the butter to smooth it, and see if the color is clear, regular, and correct in shade. Taste, and note if the salt is properly dissolved, correct in quantity, regularly distributed, and a pleasant taste left in the mouth. Press the butter with thumb or finger to test its solidity, and find if it has excess or lack of moisture. Observe the style or neatness of the package; and after noting the finish on the top, turn it bottom up and remove the package from the butter and observe the solidity of the packing, and the way in which it has stripped. Write down after each item the number of points to which you think it is entitled, and remember that "absolute perfection" in each item is equal to 100 points.

### More Items upon Dairying.

Ultimately all milk will be "pasteurised" or "sterilised," whether for use in the household as a beverage, or in the factory for butter or for cheese-making. By this process all ferments, bacteria, microbes, &c., are destroyed, making the milk safe in regard to disease germs and enabling the butter and cheesemakers to introduce specially cultivated ferments calculated to beneficially affect the flavor and general good quality of their products. The process is very simple, but requires certain apparatus and careful manipulation all through. To sterilise any liquid substance it is only necessary to submit it to a temperature of not less than 140° F. and not more than 175° F., for a longer or a shorter time, according to the temperature, and in some cases to the nature of the substance treated, and then cooling to at least 60° F.

A Danish dairyman, in 1888, suddenly found that his cream was badly affected, always acquiring a foul odor, and the butter, of course, was not good. A careful investigation by a bacteriologist resulted in the discovery of a bacillus, which he named No. 9, or *Bacillus fætidus lactis*. He also found that this bacillus could be destroyed, and excellent butter made from the cream by submitting it to a temperature of 176° F. for half a minute, or 167° F. for five minutes, or 149° F. for ten minutes; but 140° F. for half an hour failed to be effective. Directly after heating as above, the cream was cooled as much as possible under 60° F. When the cream was heated to 185° F. the butter acquired a "boiled" flavor. Pasteurised butter keeps somewhat better than that which has not been sterilised. Of late years it has been the practice in a great many of the best dairies in Denmark and America to sterilise the milk at once, then to separate the cream, and to use "special cultures" or "starters" to ripen the cream before churning. It has been found that milk separates as well at 170° F. as at 90° F.

There has been many a cow condemned because she did not give a weekly record of 14lbs. of butter, but if her year's yield had been kept it would have been found that she gave a deal more than the "show" cow which kept the lead for three months and then dried off to 3lbs. a week. It is upon the sort of cows that success in dairying depends to a great extent. A scrub cow may sometimes be more profitable than an animal of high pedigree and noble family, but this is the exception, not the rule. It is a hundred to one that you will find an unprofitable cow from a cross of a pure Jersey bull, for instance, with a cow having a good milking record, and it is about a hundred to one that a really good milker will be taken hap-hazard from a herd of beef cattle. Next to breed comes feed. If a good cow is liberally fed upon good nourishing succulent fodder, she will respond equally liberally.

"Red Water" in cows (not "tick fever") is caused generally by dry, innutritious, fibrous food. Give a dose of 1lb. epsom salts, 2ozs. pulverised gentian, and 2ozs. powdered ginger. Feed her on easily-digested nutritious food for a week or two afterwards.

The strong odor of turnips, cabbage, &c., can be eliminated from cream, without injury to the quality of the butter, by subjecting it to a temperature of 160° F. for three minutes.

Lucern should be cut and left on the field four hours before being fed to cows. This will prevent any odor being developed in the milk. Odors and bad flavors are often communicated to milk through the hands or clothes of the milker being unclean. Freshly-cut lucern will impart a bad odor to the hands, which should always be washed just prior to milking.

## APPLICATION OF LIME TO THE SOIL.

In response to inquiries concerning when and how to apply lime to clay soil, the following is abstracted from an article on "Manures and Manuring," by Mr. F. B. Guthrie, which appeared in the *New South Wales Agricultural Gazette* some time since :—

"Burnt lime, stone-lime, or quicklime is obtained by burning limestone (carbonate of lime) in kilns of special construction. Limestone is a compound containing lime and carbonic acid. In the process of burning or calcining, carbonic acid and water are driven off, and the burnt product is pure lime (calcium oxide) of greater or less purity according to the purity of the original stone. Other substances having the same composition as limestone also yield lime on being burnt, such as chalk, marble, shells, &c. If the lime has been properly burnt it forms a very hard stony substance, nearly white, which slakes,

or combines with water, with great avidity, crumbling to a fine white powder and evolving sufficient heat to convert a part of the water into steam. In slaking it combines with water, slaked lime being a hydrate of lime. As its function in the soil is principally mechanical, a test of its goodness lies in the readiness and completeness with which it slakes. Both under-burnt and over-burnt lime slake badly, though from different causes.

"The quantity to be applied varies according to the character of the soil. Unlike most of the manurial substances we shall have to consider, its action consists in improving the character of the soil rather than in acting as a direct plant-food. It is applied in quantities varying from  $\frac{1}{2}$  ton to 4 tons per acre every six or seven years, heavy clay lands requiring the larger dressing.

"It is best to break it up into small lumps and place it in heaps about the field, covered with moist loam, leaving it exposed to the air and moisture for a short time—say about twenty-four hours—until it begins to crumble to powder. As soon as this happens, scatter the heaps with a shovel as evenly as possible over the surface of the field, and harrow or plough it in lightly. Liming is most effectively done in the autumn or winter; but whenever it is done the land should be left alone for quite three weeks after the application, and no seed should be sown nor any nitrogenous manure added during that period.

"The action of lime is in the first place a mechanical one, in altering the texture of the soil, and with it those properties which depend upon its texture, such as its absorptive power for water, its amenability to tillage operations, &c.

"The action of lime upon a clay soil may be illustrated by the following experiment. If a small quantity of a heavy clay be mixed with water in any suitable vessel it will form a muddy liquid. If a little lime be added to this and the mixture well shaken it will be noticed that the solid matters sink to the bottom in a loose powder, and, in a short space of time, if the water is poured off and the soil dried, it can be readily broken up by the fingers. If no lime had been previously added the clay, on drying, would form a hard mass difficult to break up. This action, which is due to the power that the lime has of coagulating the fine particles of the clay, is identical with what takes place on the larger scale when lime is added to the field.

"The presence of lime also prevents the shrinkage which wet clay-soils undergo on drying, and which causes the cracks and fissures seen on the parched clay-soil. The admixture of lime to clay, therefore, prevents the formation of a sticky mass when wet, and a cracked parched appearance when dry.

"On light sandy soils the action of lime is also strikingly beneficial in binding the particles of sand together, and increasing the cohesive and capillary power of the soil. Its action is, in fact, exactly that of lime on sand in the mixing of mortars, only on a much modified scale, since for making mortar the proportions are one part of lime to three or four parts of sand, whereas the addition of a ton of lime per acre represents one part of lime to nearly 20,000 parts of sand. The action of the lime is the same in both cases: on drying it absorbs carbonic acid from the air, forming carbonate of lime, which cements the particles of sand together, forming, in the proportions used in making mortar, a hard compact mass, and in the case of the soil increasing its cohesiveness and its power of retaining water.

"Lime, therefore, lessens the cohesiveness of clay soils, and increases that of sandy soils, two properties which are apparently opposed to one another. In fact, there are a few soils, the mechanical texture of which is not improved by the addition of lime.

"The action of slaked lime is exactly the same as that of stone or quick lime, but not so pronounced, and it is generally preferable to use the lime unslaked, or only slightly slaked, as recommended above. Apart from the

above mechanical property of lime in improving the texture of the soil, it has also a chemical action, and, though this is not thoroughly understood, it may be classed under the following headings:—

“Firstly, it neutralises the free acids sometimes present in soils. Sour soils contain free acids present in such quantity as to be injurious to plant-life, and such soils are ‘sweetened’ by the application of lime, that is to say, the free humic and similar acids are neutralised.

“Secondly, it attacks the inert organic matters in the soil and promotes fermentation, one of the most active agents in the production of available plant-food. It is, of course, possible to have too much of a good thing, and an excessive dressing of lime would tend to burn up the vegetable matter of the soil and do as much harm as good, but in the moderate dressings above recommended it will be found beneficial even on land which has lately been green-manured. It must not be forgotten, however, that the action due to caustic lime soon ceases, for it is very rapidly converted into carbonate of lime within the soil, which has no such action on organic matter.

“Thirdly, it attacks the insoluble mineral constituents of the soil to some extent. This is notably the case with potash, which, being a weaker base than lime, is set free from its insoluble compounds, such as felspar, and rendered available as plant-food. Phosphoric acid also enters into combination with lime, and is in this form more readily utilised by the plant than in its insoluble combinations with iron and alumina, with which it is associated in the soil.

“Owing to the tendency of lime to burn up a portion of the organic matter, its benefit is more marked on soils rich in organic matter, and it is advisable to lime the soil before green-manuring, and not after.

“Fourthly, carbonate of lime (into which we have seen the lime is soon converted in the soil) is beneficial, if not necessary, to the process of nitrification, the peculiar ferment action by which the inert soil-nitrogen is converted into nitrates.

“Fifthly, whilst it promotes certain ferment action such as the above, it hinders the active growth of many fungoid diseases like rust and smut, and is said to be often a cure for such diseases.

“*Carbonate of lime*, or, as it is sometimes called, “mild lime,” is unburned limestones or shells crushed. Its addition to the soil promotes fermentation and nitrification, prevents clay lands from puddling, and in short has much the same action on the soil as lime has, except where such action depends upon the conversion of lime into carbonate. It is milder in its action, and, as a rule, burnt lime is to be preferred.

“*Gypsum* or plaster is also a substance that may be sometimes used to advantage. Its action appears to consist almost solely in setting free potash, hence it is most useful on soils rich in potash, and for such crops as clover it is of especial service. It is best applied moist or in wet weather at the rate of 2cwts. to 3cwts. per acre. Gypsum is also often used as a “fixer,” that is to say, when added to dung or urine or decaying animal and vegetable matter, it decomposes the carbonate of ammonia which is being continually evolved from such substances, and converts it into sulphate of ammonia, in which form ammonia does not escape into the air. If a heap of dung from which the odor of ammonia is perceptible be mixed with a few shovelfuls of moist gypsum, the smell will be found to have disappeared; in other words, the ammonia is “fixed,” and its loss prevented.

“Gypsum is also of great value in lands which are charged with alkali, or irrigated by alkaline water. For this purpose it is either sown on the land in proportions depending upon the amount of alkali in the soil, or it may be introduced in boxes in the irrigation sluices, or added to the tanks if the water is stored.”

## WHEAT HARVEST OF 1897-8.

The following particulars, taken from the South Australian *Register*, concerning the wheat harvest of South Australia may be taken as approximately correct:—Our estimate of the wheat production for the last harvest compares as follows with the *Register* figures for the other years indicated:—

Season.	Acres.	Total Yields. Bushels.	Average per Acre.	
			Bush.	lbs.
1890-1 .....	1,673,573	9,399,389	5	37
1891-2 .....	1,544,600	7,373,770	4	46
1892-3 .....	1,710,355	11,435,272	6	41
1893-4 .....	1,725,423	14,042,125	8	8
1894-5 .....	1,552,900	7,557,446	4	52
1895-6 .....	1,521,910	6,658,600	4	22
1896-7 .....	971,930	2,690,100	2	46
1897-8 .....	988,250	3,705,937	3	45

The average reaped last year may appear small, as it was estimated that fully one and a half million acres were put under crop at seeding; but our returns clearly prove that much more hay was cut last year than in 1896, and that a large area of sown land was not traversed by the stripper. The accounts obtained from independent sources and published by us during the past few weeks plainly showed that a liberal deduction from the area cultivated would require to be made for the purpose of arriving at the acreage reaped, and we feel certain that our figures will not be found to be an under estimate. The most northern hundreds again suffered severely from want of rain, and we are told that in some of the worst districts "the crops were a total failure, and not worth reaping." Others again are returned as averaging from 10lbs. to 20lbs. of wheat to the acre. In the Middle North the yield was much better, and production in several hundreds in the counties of Victoria and Stanley was above the average. The West Coast, taken as a whole, suffered severely, although the information received from a few centres indicates that some good crops were garnered. The Yorke's Peninsula average is again small, but in the eastern and southern hundreds—especially in portions of counties Sturt and Hindmarsh—farmers have reaped a fairly good harvest. Unfortunately, the area devoted to wheat in the South-East is limited; otherwise the yields of 12bush., 17bush., and 20bush. to the acre, reported from several hundreds in that part of the province, would materially improve the general average of the colony, and make it possible to resume exports to Europe.

## SUBSOILING TO RETAIN MOISTURE.

The question of the best depth to plough is one on which there is great difference of opinion amongst practical farmers, and, of course, the answer depends to a large extent on the depth and character of the surface soil, and of the subsoil. There is no doubt, however, that very many of our farmers plough too shallow, and on land that has been cropped for a few years a hard pan forms at a depth of a few inches, and unless this is broken, it is impossible for the soil to retain sufficient moisture to properly develop the plant in an ordinary season. By breaking up this crust or pan the winter rains penetrate the subsoil, where the moisture is stored up to be drawn upon by the crop in the summer. By means of an ordinary plough, with the mould-boards removed, or by scarifier tines following in the furrow, the subsoil can be thoroughly pulverised without bringing it to the surface, which must always be avoided.

At a meeting of the Minlaton Branch, in July, 1896, Mr. Jos. Correll strongly advocated deep ploughing for wheat, based on experiments on his own land.

He favored deep ploughing of stiff clay lands, 10in. to 12in. deep, if possible, as spring fallow, and subsoiling where the bottom is soft limestone. He considered it a mistake to plough deeply before sowing; this should be done as spring fallow.

In the annual report of the Hawkesbury Agricultural College for 1896 reference is made to the marked benefit derived from deep cultivation. Twenty-four varieties of wheat were grown to test the yields on land subsoiled to depth of 20in. the previous winter, cropped with heavy crop of tobacco in the summer, and then ploughed up 10in. deep for the wheat. No manure whatever was used, and, notwithstanding the dry seasons, the whole of the plots averaged nearly 2 ton 16cwts. of hay per acre, Talavera, Allora, Spring, and Marshall's No. 3 going 3 tons 6cwts. per acre.

In a bulletin issued by the Nebraska Agricultural Experiment Station some interesting information is given concerning the results of deep cultivation at the Experiment Farm, where the rainfall averages about 22in. In the fall (autumn) of 1891 a portion of a paddock was subsoil ploughed for sugar beets, with which it was cropped the following year. The following illustration shows the effect of this subsoiling on a crop of maize in 1895, four years afterwards, the land having been ploughed in the ordinary way only in the interval:—



Fig. 1 shows growth on ordinary ploughed ground. Fig. 2.—Row on right of illustration shows effect of subsoiling.

The subsoiled plot stands in the centre of a field in which the soil is practically the same throughout, and was prepared for this crop in exactly the

same way as the rest of the field. The rainfall for 1893-4-5 was 20in., 19in., and 16in. respectively. The subsoiled land gave a fair crop of corn, the other practically nothing.

In all cases reported to the station in which the subsoiling has been done in the fall the results have been highly satisfactory. If the effect has not been apparent the first season, owing to smallness of the rainfall, the benefit is noticed in succeeding years. One case, in which the experiment has been given a thorough trial is cited. Land subsoil ploughed in the fall of 1892, and planted to corn in the spring of 1893, yielded 75bush. per acre, as against land similarly treated, except that it was not subsoiled, of 36bush. Land subsoiled and planted to potatoes in spring of 1893 gave 125bush. per acre, against a practical failure on unsubsoiled land. The potatoes were planted on May 18; the last heavy rain of the season was on June 23, and from that date to August 16 less than half an inch fell, notwithstanding which they raised a fair crop on land subsoiled. Rye on subsoiled land gave 30½bush.; not subsoiled, 2½bush. Oats on land that had grown a crop of maize since subsoiling, 44½bush.; on land from which two crops of maize had been taken since subsoiling, 39½bush.; on land not subsoiled, 17bush. The rainfall in this district for 1893 was 28in., in 1894, 22in.

Similar experiences may be found in the reports from other experiment stations, but these are sufficient to show that more attention should be paid to this matter of subsoil stirring to conserve moisture and allow the roots of plants free access. As stated before, the depth to plough depends on the character of the soil. Some soils may be turned over to almost any depth, while others have only 4in. or 5in. of surface soil, and consequently must not be ploughed deeper. Here subsoiling should be tried. By stirring the subsoil and allowing the air to penetrate, there is no doubt the soil would gradually get deeper. Every farmer should try the experiment on a few acres for himself, bearing in mind that one season is not sufficient to decide the matter, and then follow up or discontinue the practice according to the results. It must not be forgotten that the subsoil is to be stirred, and not brought to the surface, as such action would generally be disastrous.

## THICK V. THIN SOWING OF WHEAT.

How much seed per acre should we sow? This question is often debated by farmers, but the nearest estimate of the average sowing is from 45lbs. per acre early in the season to 60lbs. later on. Some sow 30lbs. to 35lbs., and contend that this is ample to give a good crop.

How many of our farmers ever think what sowing a bushel of wheat to the acre means? The standard sample, as fixed by the Chamber of Commerce, weighs 62lbs. to the bushel, and averages from 875 to 900 grains to the ounce. Fair average seed will not average more than 800 grains, while well-cleaned, plump seed will scarcely go 700 grains to the ounce. Some will of course weigh heavier and others lighter, but a fair count of the average seed will be from 750 to 800 grains to the ounce, or 750,000 grains to the bushel of 60lbs. A square acre contains 4,840yds., or 43,560sq. ft. A bushel to the acre gives from fifteen to eighteen seeds to the square foot. Allowing for the failure of 25 per cent to germinate through cracked seed, insufficient covering of soil, loss by birds, &c. (an exceedingly liberal allowance), this gives us from twelve to fourteen plants per square foot, at least twice as many as there should be. With the seed drill from 35lbs. to 40lbs. is per acre usually sown, and, owing to the fact that the grain is all properly covered, this will give nearly as many plants per acre as a bushel sown broadcast. The natural



consequence of the plants being crowded is that they have to fight against each other for moisture and sustenance, with the result that they are weakly, and do not stool out as they should. If only half the number of plants had to find a living on this area they would naturally have a better prospect of developing into strong, hardy plants, would stool out well, and make as many heads as twice the number of plants in the same space, and the individual heads would also yield better. With the seed drill 20lbs. of wheat per acre should be sufficient to sow. This would mean a saving of about 1s. 6d. per acre in cost of seed alone at present prices. There is no doubt that in the first stage of growth the thicker sowing would promise better, but as the plants matured the thinner sown would overtake the other, and would withstand the dry weather better.

Many farmers will ridicule this idea, but if they will only try the experiment for themselves they will have a practical object lesson of the advantages of thin sowing. With the drill, a few rows—some at the rate of 20lbs., others 25lbs., and others 30lbs. per acre—could easily be sown alongside the ordinary crop, and at harvest each gathered separately, so that the exact results may be known.

As showing that even less than 20lbs. of seed per acre sown with the seed drill will produce a good crop, attention may be drawn to the experience of Mr. H. Langberg, of Connurra, a member of the Lucindale Branch Bureau. Last season he put in White Tuscan Wheat and Thomas phosphate together, and, owing to not knowing how to regulate the flow of seed, only sowed 15lbs. per acre. Notwithstanding this light sowing his crop averaged 15bush. per acre.

In a discussion in the *Cultivator and Country Gentleman* on this subject a correspondent gave his experience as follows:—"I have four men farming my land on shares, I furnishing seed and water. As the yield after a few years fell from 25bush. to 15bush. per acre, they asserted that it was because enough seed was not sown, so I told them to sow as much as they pleased. The man who had the newest and best land sowed  $1\frac{1}{2}$  bush., two others sowed a bushel and a peck, and the fourth intended to sow a bushel, but for some cause he found when he was through that he had sown only three pecks. When the grain was 6in. high the man who sowed  $1\frac{1}{2}$  bush. had the finest field, as fine as any I ever saw; but at harvest time his was shortest and thinnest, and yielded the least, while the man who sowed three pecks on the oldest land had the best yield of any. Where one man was sowing five pecks I got him to sow a few rounds with one-half shut off, and at harvest time (this was on old land) it was plain to see that there the grain was taller, the heads larger, and it ripened more naturally. It was harvested with an automatic binder, and I found that in counting the bundles, 160 rods and back, there was exactly the same number of bundles in the one case as the other, but the bundles on the thin sowing were the heavier. At another time, when one of the men was sowing a bushel, I had him sow twenty acres in the middle of the field, running 160 rods in length, with exactly  $\frac{1}{2}$  bush. to the acre. This was treated every way exactly like the remainder of the field, and was harvested and thrashed by itself, and it yielded 2bush. to the acre more than the rest of the field.

"The season in the latter case was drouthy, and it so shortened the barley crop that many of my neighbors had to use sideboards on their racks in order to carry the load. I had no such difficulty, although my land was dry and not very rich; but the crop had a liberal application of salt while it was growing, and to this I attribute the fair growth which it made. Land intended for barley should be ploughed quite deep and in narrow furrows. It is better sown broadcast than with a drill, as it is not buried so deeply when covered by a harrow.

"All these experiments were on land that was never manured, and never had

grown any lucern. On land that has been in lucern one or more years it is an easy matter to get from 40bush. to 50bush. to the acre with from 30lbs. to 40lbs. of seed. Two years ago I selected about 27lbs. of wheat—one head at a time—so as to have some that was pure Defiance. Our wheat is generally more or less mixed. Last year it was sown on newly-ploughed lucern ground. It was sown very late. The ploughing was poorly done, and when it came up it did not seem to be a quarter as thick as the piece adjoining, where about 37lbs. were sown; but there grew from each root from ten to fifteen stalks, with large heads, and although it was sown late, and shrunk so that the kernels were only about two-thirds the proper size, the yield was 38½bush. The 27lbs. was sown on one acre."

## THE VINEYARD.

### NOTES AND HINTS FOR MARCH.

*Written for the "Journal of Agriculture and Industry."*

By ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

The vintage is the main work occupying the vinegrower in March: the grapes are transferred from the vineyard to the cellar, from the care of the vinegrower to that of the winemaker. The state of maturity at which they are picked, their subsequent treatment and transformation into wine, are all questions beyond the domain of these notes. There is, therefore, little to be said so far as actual vineyard work is concerned for the month of March.

I would, however, like to raise my voice against the slovenly practice generally in vogue here of carting the fruit in dirty wagons or drays, which a few days back may have contained manure or some other malodorous substance. The sole merit of the practice lies in its convenience; the grapes are picked in small buckets and emptied into the vehicles. No doubt it has largely risen from the great distance at which many growers find themselves from the cellars; nevertheless from the winemaker's point of view it is very objectionable. In many countries the grapes are thrown into baskets or tubs, holding about 1cwt. and kept specially for the purpose; the latter are then stacked on the wagons. In others a special framework, generally of canvas, is fitted on to the vehicles during the vintage. Canvas, however, is apt to go sour, and cannot be recommended; but something on the same lines might readily be devised here—a movable wood framework lined with tin, for instance. Personally I should refuse to receive grapes packed in an open wagon or dray.

In going over their vintage growers would do well to note stray vines which are not bearing satisfactorily, so as to be able to graft them during the coming season, and render the vineyard more uniform in appearance and yield. It must be remembered that a bad or unfruitful vine absorbs as much labor and money as a heavy-bearing one, and that therefore there is no advantage in allowing it to cumber the soil.

The bunches are usually severed from the vines with knives. I much prefer cheap shears or scissors. A knife usually shakes the bunch about, causing the fall of many berries, which may to a great extent be avoided by the use of shears or scissors.

**WEED EXTERMINATOR.**—Arsenate of soda, or dissolved arsenic, is fatal to plants as well as to animals. The exterminator is made thus:—Place 1lb. powdered arsenic in 3galls. cold water; boil and continually stir for ten minutes; then add 7galls. cold water and 2lbs. crushed washing soda; bring to a boil and continue stirring till all soda is dissolved. Apply with a watering-can during dry weather.

## FARM NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,  
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The editor of the *Journal* has informed me that exception has been taken by members of the Central Bureau and others to statements in "Farm Notes" for the December issue, giving some results of the trial of hay and straw presses, conducted by the Royal Agricultural Society of England, at Nottingham, in 1888. I will therefore give more details, and will quote the table of results at length. Prizes were offered for hay and straw presses in four classes; but the table quoted gives the results in Class I., for hay and straw presses worked by steam power, and was drawn up by the Reporting Judge (D. Pidgeon, Esq., Assoc. Instit. C.E.), and embodied in his report. It is well to have cause to refer to the matter again, as there is much virtue in what, in the language of physiologists, is spoken of as "a succession of stimuli," and as the farming community would undoubtedly gain if more of these implements were in use in the colony one cannot too frequently refer to the matter. The question was brought up by Mr. Giles at the Conference of Bureaux in September last, and has received some attention since as offering a means of bringing farmers, in a sense, nearer the central market. There is no need to give more than a summary of the results of the trial, as the full report is available to all who may desire to study it, and accordingly I quote only the following table:—

## RESULTS OF TRIALS IN CLASS I.

(HAY AND STRAW PRESSES WORKED BY STEAM POWER.)

Name of Exhibitor.	Price of Machine.	Duration of Trial.	Total Weight Baled.	Quantity Baled per Day.	Mean Density of Bales.	Indicated H.P. Absorbed.	Nominal H.P. Required.	Cost of H.P. at 2s. per H.P. per day.	Cost of Labor employed at 3s. per man per day.	Total Cost of Power and Labor per day.	Cost of Baling per ton.
	£	min.	lbs.	tons.	lbs. per cub. ft.			s. d.	s. d.	s. d.	s. d.
<i>First Trials in Loose Straw.</i>											
Samuelson.	128	45	1,198	7.10	13.40	5	4	8 0	6 0	14 0	1 11½
Howard ..	40	15	656	11.70	8.90	3.5	3	6 0	18 0	24 0	2 0½
Ladd ....	80	15	788	14.00	10.77	5	4	8 0	9 0	17 0	1 2½
Foster ....	75	23	905	10.50	6.90	7	6	12 0	12 0	24 0	2 3½
<i>Second Trials in Loose Hay.</i>											
Samuelson.	128	37	1,583	11.45	19.70	5	4	8 0	6 0	14 0	1 2½
Howard ..	40	16	944	15.80	13.55	3.5	3	6 0	18 0	24 0	1 6
Ladd ....	80	11	1,185	28.80	15.40	5	4	8 0	9 0	17 0	0 7
Foster ....	75	21	1,403	17.90	9.93	7	6	12 0	12 0	24 0	1 4
<i>Final Trials in Loose New Hay.</i>											
Samuelson.	128	25	1,690	18.10	26.40	5	4	8 0	6 0	14 0	0 9
Howard ..	40	10	921	24.60	13.20	3.5	3	6 0	18 0	24 0	0 11½
Ladd ....	80	11	1,373	33.40	23.40	5	4	8 0	9 0	17 0	0 6

The first prize was awarded to Ladd & Co. and the second prize to Samuelson & Co.

I offer the above table as confirmation of the statement that *the first prize machine baled at the rate of 14 tons of loose straw per day at a cost for labor and power of 1s. 2½d. per ton, and of new hay, 33 tons, at a cost of 6d. per ton*

*for labor and power*, and that those gentlemen who questioned its accuracy may know the value of the authority whence it was taken.

The cost, no doubt, would be different in this colony, but I am not aware that authoritative trials of these implements have been held here, and as we have not so far a power press on the College Farm I could offer nothing from my own experience, and had to resort to English figures. The relative merits of straw presses was not being discussed. The importance of securing the whole or part of the straw of the farm was being urged, and it was but incidentally and by way of illustration that the cost of pressing straw was introduced, and English results were stated to show that the operation was, at most, not expensive. I might have quoted from an article written four years later by the same writer and will do so now. "Hay and straw compressors," he says "are modern machines which, while as yet finding their chief use in the compression of hay and straw for the sake of cheapening transport, will probably be hereafter recognised as more valuable storing agents than the haystack or straw rick. Hay comes to market in America in a compressed form, partly because the dry climate allows of the crop being pressed almost as soon as it is cut, but chiefly because the Yankee farmer has a very keen eye for such economical advantages as the baling system presents, whether for storing or transport over that of stacking and trussing." It is not advanced that the machine to which was awarded the first prize at the Nottingham trial is the best now, for anyone familiar with the rapid evolution of agricultural implements within the last half century will know that a report of a trial conducted nine years ago may now read as ancient history. "The efficiency," said the judges at the above trial, "is already on hand, but the economy might be greatly improved." That economy may have been brought about, I know not whether it has; but taking everything into full account—the fact that the work was done at a competitive trial, when the greatest care would be exercised to have everything in perfect working order and to take the full capacity out of the implements; that the duration of the trial was very short for any one implement (it could not be otherwise, as thirty two machines out of forty-three entries were brought forward for competition in one or other of the classes, and occupied the judges six days); that the men would be working at high pressure for the time (though the judges report that neither of the three men employed in tending the press referred to was over-worked) and would be specially selected; and that it cannot be expected with average farm hands and under ordinary working conditions to obtain results at all approximate to those obtained under such circumstances as a competitive trial—it seems to me that the work could be done here at a cost that would justify the more general use of the machine on our farms, and consequently a more general utilising of our straw.

Some farmers about this time of the year take advantage of the slackness of other work to cart out and spread farmyard manure. The land is not so soft as in the winter months, and the carting is accordingly lighter. Where good rains have fallen, and the land can be ploughed so as to bury the manure right away, the practice is on the whole a good one; but where the land cannot be ploughed now, and may not be arable for many weeks yet to come, it is a serious blunder, and leads to loss of much of the value of the manure. We cannot, under the best practice in the colony, expect to make much farmyard manure—probably not more than sufficient to dress one-thirtieth or one-fortieth of the farm each year. One is not likely to try stall feeding cattle, for example, when beef sells at 28s. per cwt. or less—generally less—and dairy cattle and breeding sows do better grazing, or at least running day and night outside, than housed almost throughout the year; and not much manure, therefore, is likely to be made, but what little is made is well worthy taking care

of, for no artificial manure can equal farmyard manure in the benefits it brings to the land. To let farmyard manure lie throughout the year in and around the onstead, in open yards and courts, where it may be dropped, exposed to the sun and liable to be leached by the rains and have its fertilising material (or as much of it as is soluble) washed into the dam or dams, or into the nearest watercourse, and at the same time lay out money for artificial fertilisers, is ridiculous extravagance. The old-fashioned farmyard manure is better all round than the best of modern artificial manures, and will be cared for and used wherever good farming is practised for time yet to come. Some agricultural chemists point to the small percentage of manurial constituents in it: nitrogen 0.5 per cent., phosphoric acid 0.3, and potash 0.52—that is, about 11lbs. of nitrogen and potash per ton, and 6lbs. or 7lbs. of phosphoric acid—and to the labor required in the making, carting, and spreading of it, and argue that its use is unprofitable compared with artificial mixtures; but they seem to overlook the long number of years the influence of a good dressing lasts in the land, and of the physical as well as the chemical effects which it exerts over and above the mere supplying of the elements of plant food to the soil. It improves the physical state of soils, opens heavy soils and makes them more easily worked, and assists materially in the retention of moisture—a most important advantage in our climate.

One of the best means of making farmyard manure is to collect it daily, or at intervals of a few days, in a pit constructed for the purpose. Drive over the manure in the pit if possible with each day or week's addition so as to firm it, and prevent too rapid fermentation, and keep the manure moist when practicable for the same reason. Covering it occasionally with a layer of earth is a good plan, as far as direct utility goes, but it is expensive, and gypsum and sulphate of iron, which are often recommended, have been found to be of very little use in fixing ammonia, though useful for strewing on a stable floor now and again. The best time to cart out farmyard manure in this district is immediately after seed time. It cannot be applied to a cereal crop directly, because it renders the crop so foul, and should be used for a crop that can be cleaned, *e.g.*, mangels or kale, or spread on the land that is to be fallowed, and covered directly with a good strong furrow. By the time the land has been worked in the various fallowing operations, and strewed now and again during the summer, the manure will have become nicely incorporated with the soil, and will then give excellent results in cereals. It must not be applied too heavily in this climate (probably 9 tons or 10 tons per acre is sufficient for cereals), as the crop blights or is liable to blight when the first burst of hot weather comes on it if too heavy dressings have been used and the manure has been good. For forage crops, such as mangels and kale, up to 22 tons per acre may be readily used.

In next month's notes I propose to discuss artificial manures carefully, and in the meantime will only say that phosphatic manures will be found almost invariably the most beneficial for cereal crops in the colony generally. With phosphates in some districts, more especially those with a greater rainfall, nitrogenous manures, such as nitrate of soda or sulphate of ammonia, might with advantage be used, in the proportion of one to three, or thereabout; but phosphates should have first consideration. On this farm, year after year, phosphates alone have given good results, and often better than phosphates with nitrogenous manures added. Of the phosphates, the more soluble, such as the superphosphates, are much to be preferred; but each man will do well to conduct a few careful comparative tests of the different manures on the market individually, and in mixtures phosphatic and nitrogenous, on plots of a few chains area, to prove for himself the most suitable manure for the land, and the most profitable in view of the cost price.

## ORCHARD NOTES FOR MARCH.

By GEORGE QUINN, INSPECTOR OF FRUIT.

The harvesting of the fruit crops is being performed much more rapidly this season, and by the end of this month very few sorts will remain ungathered. There has been a shortage all round, and good prices—better than have been obtained for some years—have ruled. Growers anywhere near the large centres have not been driven to drying operations for want of a fresh market for their apricots, peaches, and plums, as all have been eagerly sought for by the makers of preserves.

The apple trees last year were taxed to the uttermost to carry their crops, but the natural consequence, that is reduced vitality, combined with the drought, have put such a strain upon the trees that the crop this season is reported everywhere as patchy. The question of storing arises, as it is evident a very few months' supply is visible, and high prices must rule later on. In most of our apple districts any sort of a shed has been deemed suitable for an apple-house, but such an idea is far from accurate. Many places are simply supplied with a slab shed, as draughty as possible, in which the apples are piled in heaps on shelves. The fruits in the centre of the pile remain crisp and full, but those outside shrivel badly from exposure. Draughts should be avoided, but the ingress and egress of fresh air is a necessity. A building of a semi-subterranean character, with thatched roof, plastered with clay or lime plaster, makes an excellent storehouse if properly ventilated.

As it seems only a matter of time until the destructive codlin moth invades all of our apple districts, anyone erecting an apple-house should construct it so that it can be completely closed and fumigated or the moths destroyed as they hatch out from the shelves, as in storing apples or pears some infested fruits will sure to escape observation and be placed upon the shelves from whence the larvæ will develop into moths next season.

The export of fruit will be light this year, but it is gratifying to note that some growers are sending a few cases to keep the South Australian fruits before the London public. The sample is smaller than during past seasons, but the fruits are remarkably free of disease, and a further improvement is noticeable in the general grading and packing, in fact some of the cases approach the get up of foreign fruits very closely indeed. Further attempts at the export of pears in small flat boxes, in which one layer of fruit is packed carefully in wood wool, are being made by an enterprising grower in the Hills. When harvesting apples it is best to make several trips around, as when the majority of the largest fruits are removed the smaller specimens have a chance to enlarge.

Where water is at hand a good soaking early in the month will be very beneficial to loquat trees, as it enables them to ripen the growths upon which the bloom will appear later. The citrus trees often suffer here late in the autumn, before sufficient rain has fallen to soak the ground, for when the weather cools one is apt to forget that the ground is dry. The season has done great harm to the citrus tribe, and lemons should be pruned out carefully. As opportunity occurs all the dead wood should be cut out carefully back to where young growth is emerging. In fact just now is not a bad time to remove large limbs from citrus trees. If the plants can be taken up with a good ball of earth adhering to the roots now is a fairly good time to transplant citrus trees, as they will get a start before the winter comes; but, on the whole, I certainly prefer spring planting for these fruits. In the early days of the month a sufficient sap may be flowing in peach, apricot, orange, lemon, and apple stocks to permit budding being performed, but this can only be settled in each instance by

testing the bark to see if it lifts readily. Buds put in now will remain dormant until next spring, and the tops should not be cut off above the buds until the winter pruning period. The ties should be loosened or removed from earlier buds, as the stems swell considerably towards the end of the season, when the growth slackens, and any constriction around the bud may ruin its chance of life. Cultural operations are just about at a standstill now.

In the matter of insect pests, bandages should be carefully examined each week for the caterpillars of codlin moth. These should be crushed at once, and care taken not to miss any that may be concealed in the cracks of the bark beneath the bandages, or in the seams of the bagging.

As the weight of fruit is removed from the limbs where props are used, these props should be examined, and, if much cracked, should be used as fuel at once, for they are a favorite hiding-place for codlin larvæ. All fallen apples should be gathered frequently, and immersed in limewater, or boiled up for pigs at once, and not left standing about in heaps.

The red scale of the citrus trees will be breeding freely now, and it is a good time to spray them with resin wash.

One thing is necessary before using resin spray on any tree in foliage, and that is the tree must be well supplied with moisture at the roots. If this precaution is not observed the stopping of the pores of the leaves is fatal to them, and they fall almost immediately.

The formula of the resin wash found most successful here for red scale is 10lbs. resin, 10lbs. washing soda, 5lbs. soft soap, boiled in the usual manner, and enough water added to make 50galls. for spraying.

If two thorough sprayings with this are given, once each in March and April, I am certain, from my own experiences, that there will be very few living scales—or dead ones either—upon the fruits when gathered for market; but the sprayings must be as thorough as it is possible to give them, and where judicious pruning has been applied in the direction of opening the interior of the trees much better results can be obtained.

## NOTES ON VEGETABLE-GROWING FOR MARCH.

BY GEORGE QUINN.

This is a most important month in the vegetable garden. All sorts of winter vegetables should be sown, and most kinds sown formerly transplanted.

Seed beds should be prepared and sown with cabbage, lettuce, cauliflower, celery, onions, kohlrabi, celeriac, and beets of various kinds, and Brussels sprouts. It must not be imagined that irrigation can be dispensed with after a few autumn showers; therefore those growers on the plains who have not abundance of water should hesitate before planting main crops in the open garden. If water is at command, sowings should be made in thoroughly well-prepared ground of peas, beans (broad), carrots, parsnips, radishes, turnips, both ordinary and Swedes, spinach, and parsley, and transplantings made of cabbage, cauliflower, lettuce, and kohlrabi, and Brussels sprouts. Potatoes may be planted where early frosts are rare. All of these crops require plenty of manure when grown on most soils, but the kind of manure and the time of application are most important studies. It may be taken as a general rule that root crops, such as carrot, parsnip, turnip, and beets, do not make the best roots when barnyard manure is applied just prior to the seeds being sown. Land which has produced a crop of cabbages, onions, or potatoes since being heavily dressed with fresh manure generally gives the best returns in garden root crops.

A good loose soil containing plenty of plant food suits them best, and they should be sown in rows; the distance between the rows will be determined by the locality—one yielding a ranker growth than another. Anyway, there should be room between the rows, say from 1 ft. upward, so that there will be no difficulty in hoeing the space frequently.

Very often the weeds grow more rapidly than the plants. In such instances it is a good plan to stretch a line along the course of the rows—should the plants be overgrown—as this will allow the gardener to use the hoe with more confidence.

If, when the peas begin to peep up, the sparrows start to nip them off fine black cottons should be stretched along the rows about 2 in. from the ground. These are almost invisible, and seem to scare the birds until the plants become fairly established. When planting out the early crops it is advisable to put a mulch of fine manure, about 1 in. deep, over the surface of the bed, or at least around the plants for a radius of a foot. The ground should be soaked well, and the sprinkler will have a reviving effect overhead should the season continue dry.

Celery is planted in trenches made about 18 in. deep. The bottom of the trench should be broken up with a fork, and well-rotted manure placed in the bottom. As the plants grow they must be earthed up, to bleach the stems; but the stems should be folded closely together, so that no earth is closed in. When potatoes are planted at this period the water should not be allowed to spread in such a way over the surface as to cause it to bake.

Anyone buying young cabbage or cauliflower plants will act wisely by dipping their roots and tops in a strong solution of kerosene soap prior to setting them out, as this will destroy any of the aphides or green caterpillars that almost invariably attack early crops of these sorts.

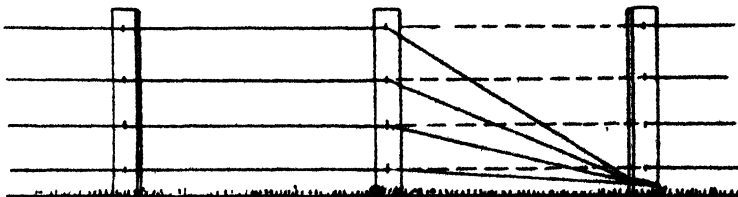
While giving attention to the coming crops those at present yielding returns should not be forgotten. Tomatoes require staking or tying up; cucumbers, plenty of water; beans should be selected for seeds; and pie melons, pumpkins, and trombones should be gathered carefully into shelter before rains become general.

In early localities the seed stems can be cut away from asparagus plants.

Seeds may be gathered from onions and parsley, while bunches of herbs should be cut for future use whenever procurable.

## NEW IDEA IN WIRE FENCING.

*The American Agriculturist* says:—"Where a wire fence is stretched tightly (as it must be stretched, if it is to be most serviceable), it is important that the post where the wires start be unyielding. Where the wires are attached to the post in the ordinary way, the post will "give," and the wires become slack.



The cut shows an excellent plan to keep the wires, whether barbed or plain, tight and unyielding. They all start from the bottom of the first post, close to the ground, where they have no "purchase" upon the post to draw it out of



position; then pass up through staples to their proper positions on the second post, and so on along the line. Short pieces of wire are put in between the first and second posts where the dotted lines appear. This is a much simpler plan than trying to "anchor" the post, and put the wires on in position at the start.

## FARM PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

February 28th, 1898.

February continued very dry, with several almost insufferable spells of heat, rendered worse in the city by the bush fires that were raging amongst the hills. About the middle of the month heavy monsoonal rains were experienced in our far north and north-eastern pastoral districts. Throughout the other parts of the colony during the past few days rain has set in; but reports from the country show that the fall till now has been very patchy. Feed, although dry, is not so scarce as it was at this time last year, chiefly the result, unfortunately, of the heavy losses experienced by stockowners. Business is moderately active in most country districts as well as in the city.

The *South Australian Register's* estimate of the average of wheat reaped this season places the yield at 3½ bush. per acre, which would give a surplus available for export of about 19,000 tons. Trade critics generally accept these figures as being fairly correct, at any rate not over estimating the out-turn. In the grain market a very quiet month has been experienced. Quotations for wheat are 1d. lower than when we last reported, but as farmers generally are disinclined to accept present rates, in the hope of improvement later on, very little grain is offering—not more than sufficient for millers' local wants. Sydney continues to quote wheat and flour lower than either Victoria or this colony, and, in consequence, is securing orders which in the past have been usually shipped from Adelaide or Melbourne. Some large lots of New South Wales wheat are now loading for South Africa as well as parcels booked for Mediterranean ports. The lower rate of the Sydney market is attributed chiefly to the fact that Californian flour has been landed there down to £9 5s. per ton. Many farmers in New South Wales and Victoria, not content with the values offering for their wheat, in several directions are making organised attempts to ship on their own account, hoping thus to receive full benefit of co-operation in shipments, and at the same time, by relieving the local market, to enhance their home values. The experiment is being watched with interest by those interested in the grain trade in this colony, as it will probably have a marked bearing on the future of prices here. Feeding grains are better with us, but hay and chaff show decidedly easier tendency.

The absence of rain has created considerable speculation in potatoes throughout Australia, and at the moment extreme rates are being obtained. Even now, however, it is not too late for a general downpour to considerably increase the yield, and cause a corresponding drop in value. As we anticipated last month, the local drug in the onion market did not long continue, and in this line, for the climatic reasons above stated, prices have also considerably advanced. Wheat, 4s. 4d. to 4s. 4½d.; flour, £10 15s., with £11 being paid for forward delivery contracts; bran, 1s.; pollard, 1s. 1d.; chaff, £3 15s. to £4 per long ton, bags in, dumped, f.o.b. Port Adelaide; oats, Algerian and dun, 2s. 2d. to 2s. 6d.; stout white feed, 2s. 8d. to 3s.; barley, feeding 3s. to 3s. 3d., malting, 4s. 3d. to 5s.; Mount Gambier potatoes, £8 10s. to £9 5s. per ton delivered Adelaide railway station; onions, £5 15s. to £6 5s. for good to prime samples.

## DAIRY PRODUCE.

In dairy produce a very heavy month's business has been put through, increasing quantities of imported butter being required to make up for the steady shrinkage in local supply. Values eased off slightly for a few days early in the month, but in consequence of large fires that were raging throughout dairying country, particularly in Victoria and Tasmania, Melbourne prices sharply advanced to beyond relative European values. This at once curtailed exportations from Victoria, with the result that a slight check to the upward trend in price has been experienced, with every probability of still further easing in that market as even at present the Australian colonies are producing butter in excess of their requirements. Under any conditions, however, South Australia will have to import for some time to come. The strong Westralian demand continuing for eggs, this line, with slight oscillations, further advanced, and is likely to rule still higher. Honey is more plentiful, but demand being brisk, values fully maintain. Heavy quitances experienced in cheese, and, with stocks light for time of year, this line also may be expected to favor sellers. Active business done in bacon and hams. Almonds selling more readily, but prices still rule low. In the poultry market values advanced in the early part of the month, and have since continued to realise satisfactorily for consignors.

Latest selling rates are as follow : — Factory and creamery fresh butter in prints, 1s. 6d. to 1s. 9d ; farmers' separator and good dairy boxes, 1s. 2d. to 1s. 6d. ; good store and collectors' lines, 9½d. to 11½d. ; heated, creamy, and off-conditioned lots, 6d. to 7½d. ; imported, bulk, 11½d. to 1s. 1½d. Hen-eggs, 1s. 2d. Cheese, 7½d. to 8½d. for best quality ; ordinary grades, 6½d. to 7½d. Factory-cured sides of bacon, 9d. to 9½d. ; farm flitches, 8d. to 8½d. Lard, in bladders, 7d. to 7½d. ; tins, 6½d. to 6¾d. Honey, 3½d. for good samples ; bee-wax, 1s. 1½d. In live poultry, fowls sell at 1s. 1d. to 1s. 4d. for medium to good hens ; old roosters to good young cockerels, 1s. 2d. to 1s. 8d. ; ducks, 1s. 6d. to 2s. 2d. ; Pekins, to 2s. 9d. ; pigeons, 6½d. ; geese, 2s. 5d. to 3s. ; turkeys, 7d. to 9½d. per pound live weight.

## WEATHER AND CROP REPORTS.

**BOWHILL.**—Harvest operations are finished, and the numerous stacks of straw together with the savings of the stubbles show the lessons of the drought have not all been lost. Farmers are getting ready for ploughing, and there is likely to be a larger area cropped than in previous seasons.

**CHERRY GARDENS.**—The weather continues hot and dry, and has had the effect of causing a number of landholders to put down wells, which generally give a good supply at a shallow depth.

**COLTON.**—This season has been the hottest and driest ever experienced here. Fruit of all kinds was very scarce and poor, and much damaged. The Elliston district has not averaged more than 2½bush. of wheat per acre.

**FOSTER.**—The weather has been exceedingly hot, up to 113° F. in the shade, but light rains have since fallen. The weather has been most suitable for scrub burning.

**LUCINDALE.**—Owing to the extreme heat and the long dry spell the level of the springs is very low, and many holes have had to be deepened. Stock look well. No rainfall recorded for the month.

**MOUNT BRYAN EAST.**—The weather during past few months has been almost the hottest ever recorded for this district. Many crops returned little more than seed, some not that, and others up to 4bush. to the acre.

**MOUNT COMPASS.**—The weather continues hot and dry. The potato crop is light and other vegetables poor and scarce. Stock remain in good condition.

**PINE FOREST.**—The weather during past two months has been very hot and dry, with heavy winds. Fruit trees have suffered severely, and the fruit is very poor. Stock are in good condition. On February 8 over an inch of rain fell.

**SADDLEWORTH.**—In the absence of rain the dry feed is of good quality ; consequently all stock keep in good condition. Sheep are fat. Summer fallowing on loose black ground has begun. Sorghum is backward, a large area was put under this summer crop, but with little return in many cases, except where left for seed it is now being fed off. The River Gilbert is drier than for twenty years at least. Rainfall for January, nil ; February, to 20th, .460in.

**SEED OF TOMATOES.**—To clean and save seeds of tomatoes, strawberries, and such like is rather troublesome unless you know how to do it. Get some clean, sharp, fine sand, rub the pulp of the tomatoes, &c., between the hands along with the sand, then place in a sieve with meshes fine enough to retain the seeds, but allow the sand to pass through. Immerse in a pan of water, which will carry off the comminuted pulp, allow the sand to escape through the meshes of the sieve, and the clean seeds will remain, and can be quickly dried on a cloth exposed to the sun.

**IMPORTS OF PRODUCE INTO GREAT BRITAIN.**—During the twelve months ending August 31st, 1897, the following quantities of produce in which South Australia is interested were imported :—

	Quantity.	Value.	Increase over Previous Year.
Bacon .....	4,931,846wts.	£8,612,983	£870,000
Hams .....	1,640,642 "	3,577,522	587,000
Rabbits ....	237,943 "	492,200	124,000
Butter .....	3,188,918 "	15,940,599	960,000
Cheese .....	2,449,543 "	5,596,043	1,080,000
Eggs .....	13,954,024 great hundreds	4,310,599	220,000
Apples .....	7,178,789 bushels	1,834,627	978,000
Pears .....	761,349 "	285,474	90,000

## CENTRAL AGRICULTURAL BUREAU.

MONDAY, FEBRUARY 21, 1898.

Present—Mr. F. E. H. W. Krichauff (Chairman), Messrs. S. Goode, W. C. Grasby, M. Holtze, H. Kelly, T. B. Robson, C. J. Valentine, and A. Molineux (Secretary).

### Finance.

The Finance Committee reported expenditure to date for contingencies £603 11s. 7d.; balance £156 8s. 5d. Accounts to the amount of £106 15s. 4d. were passed for payment. The Chairman said there would be less than £50 left for the next four months' payments. It was absolutely necessary that something should be done at once to adjust the finances. After some discussion it was resolved that the Finance Committee wait on the Acting Minister of Agriculture and represent to him the present state of the Bureau fund, and that "the Minister be advised that the Bureau respectfully declines to assume any further responsibility in regard to the publication of the *Journal of Agriculture and Industry* until sufficient funds are provided."

The members waited on the Acting Minister, who promised that, pending the return of the Minister, sufficient funds would be provided to meet the next month's accounts.

### Conferences and Shows.

The SECRETARY called attention to the fact that the following Conferences and Shows in connection with the Branches would be held during the month of March:—South-Eastern Conference, at Bordertown, on March 16; Show of Produce, at Meadows, on March 16; Show of Produce, in connection with Belair, Clarendon, and Cherry Gardens Branches, at Cherry Gardens, on March 17; Northern Yorke's Peninsula Conference, at Alford, on March 23; Southern Conference, at Struthalbyn, on March 31.

It was decided that, as far as possible, the Central Bureau should be represented at each of these meetings, and several members promised to attend one or other of them.

Members of Branches are reminded that when travelling by rail to Bureau meetings they can, on application to the Central Bureau, obtain certificates enabling them to obtain return railway tickets at single fares.

### Donations and Exchanges.

The SECRETARY announced receipt of usual exchanges from various Agricultural Departments and kindred institutions.

### English Wheat Crop.

The CHAIRMAN said that in a letter addressed by Sir J. B. Lawes, of Rothamstead, to the *Illustrirte Landwirtschaftliche Zeitung* he states that England will have to import 24 million quarters of wheat. The crop of the United Kingdom was about 26½ bush. per acre from 1,936,041 acres. His own crop on land not manured was 8½ bush.; manured with stable dung, 37½ bush.; with artificial manures, differing between 27½ bush. and 37 bush. per acre. The unusually heavy rainfall in September, 1896, which was 5½ in. over the average, caused serious loss of nitric acid from the soil. In other years the rains in September cause an average loss of 19½ lbs. of nitric acid per acre from 20 in. of the top soil; but in September, 1896, this loss was 130½ lbs. In connection with the experiments for growing wheat as carried on at Rothamstead

ever since 1843, it is interesting to know that almost every year the crop is heaviest on land manured with 28,000lbs of stable dung per acre. In later years nitrate of soda and sulphate of ammonia have been divided into two equal doses, one used in autumn, the other as top-dressing. It is, however, clear that where equal quantities of nitrate of soda and sulphate of ammonia alone were used the former was preferable as three to two.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical papers:—

191. *Pierofetudin*, since 1894, is more and more used to prevent hares, rabbits, and deer from gnawing the bark of fruit and forest trees, for which invention Mr. Forester Laage received the silver medal. It is not soluble in water, the heat of summer does not melt it. Although it contains oil and is very sticky, it does not interfere with the growth of the trees.

192. *Nematodes in Oats*.—L. Holbrung, director of the experimental station at Halle, for the destruction of nematodes, &c., lately received oats from Holstein, which after three weeks' growth looked quite sickly, while an adjoining field of oats, sown three days later, but which had previously the same crop, and was manured in the same way, remained quite healthy. He found that the roots of the oats from the affected field had many nematodes of the beet (*Heterodora Schachtii*) on them. For four years at least no beets had grown on the land. He advises to use a skimming plough, after twenty-four hours to harrow, and after another day to plough the land. By so doing the development of four to six other generations of nematodes will be hindered. Beets, cabbages, and turnips ought not to be planted on the land for years. Barley and wheat would also not be quite safe, while rye, clover, peas, carrots and onions would not be attacked.

193. *Market for Fruit*.—At the second market, held on the 8th day of October, at Frankfort-on-Maine, apples for cider-making sold at 12s. to 13s. per 200lbs. Table apples sold per 100lbs., viz. — Borsdorfer, at 20s. to 25s.; most of Reinettes, at from 18s. to 25s.; Landsberger, to 30s.; Yellow Bellefleur, at 30s. to 35s.; Gravenstein, 20s. to 25s.; White Winter Calville, £6 to £7 10s. Even the best kinds of pears did not command more than 20s. per 100lbs., and quinces, 12s. [The cost of sending 200lbs. apples to London would be about 39s.—GEN. SEC.]

194. *Fruit from a Hygienic Standpoint*.—In the year 1778, Stolbertus, a medical man, wrote: "How desirable it would be if chemists cleared part of their shops of powders, &c., and placed there instead white baskets with fruit, and thus changed half of their shops into a fruit market." Dr. O. Gotthilf gives the following hints worthy of consideration:—While fruits contain little nutritive matter other than sugar and organic salts, the acids give them the characteristic taste and particular aroma, but supply to the body little albuminous matter which repairs wasted tissue and increases the amount of flesh. One would not well live upon fruit alone, except by the consumption of a prodigious quantity. A hen's egg, weighing 45g., contains about 5g. of albumen, which quantity you could only consume in 550g. of cherries, 620g. of plums; 1,260g. of apples, or 2,000g. of pears. The physiological effect of fruit on our body is that the sour and acidulous kinds, such as currants and plums, are purging, while the sweet berries of the vine lead to constipation. In the former we have a mild-acting purgative. If the skins, kernels, seeds, and fibrous parts are swallowed the fruit cannot be digested so easily. These are only a useless ballast for the stomach and the intestines, and actually dangerous if they settle in the blind gut. Professor Uffelmann has pointed out what a favorable influence is exercised by fruit as a course of medicine in cases of acute constipation, chronic catarrh of the stomach (especially after the immoderate use of spirituous liquors), hamorrhoids, scorbutic, blood congestion on the brain, and in certain diseases of the liver and the spleen. For feverish sickness the cold liquid of boiled fruit is a veritable refreshment. Cider is very good for persons who drink or eat much, and it has altogether a medicinal effect on persons troubled with gravel. Medical men know that in localities where much cider is consumed operations for gravel occur very seldom. The grape-cure can be used for nourishing the body when one eats sweet grapes and much lean meat; or, if it is desired to get lean, eat sour grapes and but little meat, and at the time take no hard, fat, or raw food, as pork, cheese, heavy cake, fatty farinaceous foods, rye bread, and but little water. Wine is not objectionable, but milk shortly before or after eating the grapes is not good.

195. *Steam-pressed Straw*.—At the Hamburg Exhibition eight different presses for straw were shown, some of which would enable farmers to keep nearly 6cwts. of straw within the space of a cubic metre (14in. x 14in.) and 200cwts. could be packed in a railway wagon against 40cwts. not so pressed.

196. *Grafting to Obtain Plants with Variegated Leaves.*—Inspector of Gardens Lindemuth has shown at Berlin a number of Malvæ, and says that if you have one variety of a genus or of allied genera with variegated leaves you may, by grafting such on any other, make the stock bring forth variegated leaves below the graft. He also grafted *Petunia nyctaginiflora* upon tobacco plants, and *Helianthus annuus* on *Helianthus tuberosus* to obtain them on high stems.

197. *Common Salt as a Manure.*—According to Professor Dr. Maercker and Dr. Stoffeck sodium chloride cannot be used in place of potash manures. Their experiments show that a small increase may be obtained from a small quantity of salt poor in potash, but a larger quantity would poison the soil and decrease the crop of such plants as they tried. Some plants, like mustard, did show actually a decrease in the crop with the smaller quantity of salt. Oats, which produced with at the rate of 1,000lbs. of potash 108·83g., against 96·62g. without manure, gave only 42·89g. if manured at the rate of 1,000lbs. with salt, and only 17·80g. if salt at the rate of 2,000lbs. was given. Even where in the first year an advantage may be discerned in the second and in after years the use of salt in place of potash is certainly injurious.

198. *Lime in Agriculture* is not only important for all soil deficient in it, but Professor Dr. Maercker says that it acts very favorably in the process of germination, which in many soils is very irregular, and in the first stages of development plants are generally not as strong and healthy as where lime is used. Dr. Shultz-Lupitz also found that his first failures with phosphatic and potassic manures were the result of a want of lime for the growth of nitrogen-collecting plants, when he desired to enrich his poor soils with nitrogen. How much lime has been used of late in Germany as a means of unlocking plant food can be best understood when it is stated that one manufactory in the Hartz Mountains alone burns half a million pounds of lime every day, and 180,000cwt. of fine dust of lime are sold annually for agricultural purposes. I went myself over another, near Itzehoe, in Holstein, fifteen years ago, where cement was the chief product, but for agricultural purposes a very large number of limekilns were under one roof and connected by a private railway of some miles, with the railway system of the duchy. For heavier soils lime is of the greatest mechanical value; for others where we find a surplus of free acids, it is a kind of medicine, which neutralises them and thus prevents their noxious influence. Soluble combinations of iron are also prevented, phosphoric acid is altered to calcium phosphate, the formation of lime-zeolites absorbs the potash, and the oxidation of organic substances in the soil develops carbonic acid, which is necessary for the solution of plant food. A soil without lime is dead, even if enriched by manures. A strong formation of saltpetre cannot take place without much lime, and thus nitrogen cannot be absorbed by plants.

199. *Holstein Cows.*—The marshes near the River Elbe are now used more for dairying than for the growth of cereals. The yearly average of milk from cows grazing on land of the third and fourth class is 700galls. of 3·39 per cent. of fat, while on better soil the average is 933galls., and the percentage of fat is much higher, so that at the end of the year a further payment is made for the excess in fat. Dr. Neumann in a long report gives full data of the milk of ten Holstein cows from the Nathenkühl herd, near Lubeck, for the year 1896. One cow was very inferior, giving only 5,490lbs. of milk of an average of 3·85 per cent. of butter-fat, while the others gave from 7,290lbs. up to 9,942lbs. of milk of an average butter-fat of from 3·50 per cent. to 4·42 per cent., and at the best time it ranged from 4·75 per cent. to 7·30 per cent. Cows from Breitenburg, in Holstein, naturalised in Hungary, gave on an average 734galls. of milk with 3·3 per cent. of butter-fat.

200. *Fat in Milk.*—Dr. Raven states that the fat in the milk of cows, which received daily 4lb. of copra, increased on an average 0·77 per cent.

201. *Exhausted Lands for Cereals.*—In looking over old letters from the late Baron Ferd. von Mueller, I found in one dated as long ago as June, 1864, an analysis recorded by him of soil sent to him by the South Australian Company. He says the land is exhausted for cereals. It contains neither potash nor phosphoric acid and lime, and poor crops cannot therefore surprise the tenants, as the quantity of cereals already removed stand probably everywhere in no proportion to the manuring.

202. *Anthrax.*—The germs of this infectious disease remain for years in the soil where animals died from it and have been buried. Animals pasturing or even working there are liable to contract the disease from these germs. It is best to burn all infected carcasses.

### Smyrna Fig and Caprifigation.

Mr. T. B. Robson tabled samples of White Adriatic, Trojan, and Smyrna figs grown by himself, and read the following notes on the subject:—

Many years ago the Chamber of Manufactures introduced cuttings of the drying fig from Smyrna, which, after being rooted in the Botanic Gardens, were distributed. I have

two, which have grown to good-sized trees. Later, through the Bureau, a further importation was made, including also the Capri fig. The trees from these are now of a fruit-bearing age, and, so far as I can judge, the drying fig is the same variety as the first importation. I have not been able to get the name, but it is probably one of the three varieties grown in Smyrna for drying, viz.:—Lop, Bardajik, and Sheker. The Smyrna fig has both in Australia and California persistently dropped its fruit for want of a fertilising agent, which has been proved by the fact that with artificial fertilisation the fruit matures. A sample in a partially dried state is here for your inspection. I used a bottle to hold the pollen, from the Capri fig, which I blew into the fig by means of a pointed glass tube, and succeeded in obtaining over a dozen perfect figs this season. The Capri fig matures its first crop in time for the second crop Smyrna figs, which are then half grown, and would, if not fertilised, drop off a few days later. This experiment, which agrees with a similar one I tried two years ago, proves that this variety of fig is useless without some means of cross-fertilisation with the Capri fig. It also, from its appearance and good quality when dried, is undoubtedly the true Smyrna drying fig. Its cultivation will be quite useless unless some means is found whereby this cross-fertilisation may be brought about. Possibly we may have some native insects that will do it: if not it will be necessary to adopt the Smyrna method, if the cynip fly can be introduced, but such an attempt would be premature until our Capri fig trees are old enough to bear regular crops. I have a graft of the Capri fig growing in the centre of one of my large trees of the drying variety, which should next season yield sufficient fruit to have the effect of causing the fruit to set and mature, if such a thing is possible under present conditions. Some of the first crop of the Smyrna figs mature naturally, but these are useless for drying.

A discussion followed, Mr. Grasby contending that more reliance was to be placed on the practical experience of the growers in the Neander Valley for centuries than on the investigations of scientific authorities, and he was sure we would have to introduce the *Blastophaga* before we could expect to get crops from the true Smyrna fig trees.

### **Branch at Hallett.**

It was decided to approve of the formation of a Branch of the Bureau at Hallett if suitable gentlemen are willing to act as members.

### **New Members.**

The following gentlemen were approved as members of the undermentioned Branches:—Lyrup, Mr. O. Klemm; Lucindale, Mr. H. J. Deeble; Mylor, Mr. S. W. Jackman; Port Broughton, Messrs. E. Dalby, E. Dennis, and J. Bates.

### **Reports by Branches.**

The SECRETARY reported receipt since previous meeting of forty-five reports of Branch meetings.

## **REPORTS BY BRANCHES.**

### **Port Elliot, January 29.**

Present—Messrs. C. H. Hussey (Chairman), P. O. Hutchinson, H. Green, E. Wood, and E. Darwin.

CURE-ALL.—Mr. Hutchinson read letter received from Mr. Jackson, of Wentworth, concerning an alleged remedy for all agricultural and horticultural pests, which was also a powerful fertiliser. [There are a good many persons who, according to their own statements, are in possession of perfect cures for all insect and fungus pests; but this individual goes one better, as he claims to possess a specific which is not only a remedy for all insects and fungi, but also destroys weeds of all descriptions, while, strange to say, it is absolutely harmless to fruit trees. All such persons are willing to disclose the secret of their remedies for a consideration. The Bureau has had numerous offers of this

description, including Mr. Jackson's, but has always required that the individuals should prove that their nostrums will do what they claim before making any recommendation to the Government; but this has generally ended the matter. Our members are consequently strongly advised to take no notice of these absurd claims.—GEN. SEC.]

### **Lyrup, January 11.**

Present—Messrs. A. Pomeroy (Chairman), D. J. Bennett, T. Nolan, A. Weaver, and A. Thornett.

EXPERIMENTS.—Members stated that the yield of Dart's Imperial Wheat, from a plot of land 40ft. by 13ft., which was given as at the rate of 75bush. per acre, was correct, the wheat having been grown by Mr. Pomeroy, and the results carefully checked. Mr. Nolan reported that White Kaffir Corn was doing better than the red.

RAINFALL.—For December, 0·085in.

### **Holder, January 28.**

Present—Messrs. F. A. Grant (Chairman), E. Crocker, F. Rogers, F. Slater, T. Basford, J. O'Connell, J. Maddocks, P. J. Brougham, J. Mitty, C. Anderson, J. J. Odgers (Hon. Sec.), and one visitor.

SEED EXPERIMENTS.—Members reported Cow peas growing well; also black maize up to 5ft. 6in. high, but cobs failed. Kaffir corn has done well throughout the district.

PIG-BREEDING.—The Hon. Sec. was instructed to inquire price, &c., of pure Berkshire boar, about eighteen months old.

### **Narridy, January 15.**

Present—Messrs. A. McDonald (Chairman), H. Nicholls, W. J. Porter, J. Little, P. Beckmann, W. J. Martin, R. Satchell, and J. Darley (Hon. Sec.).

EXPERIMENTS.—Mr. Satchell reported that 3lbs. of Dart's Imperial wheat sown yielded 18lbs. of good sound grain, being equal to 2bush. per acre more than from Leak's Rust-proof, sown alongside. The Hon. Sec. said he had raised plants of Saltbush from seed received from the Central Bureau, and these were growing well.

WHEAT.—A discussion took place on the best varieties of wheat to sow in this district in dry seasons. Members generally favored Steinwedel and Hamlyn's Rust-proof. Mr. McDonald had best results from Early Show this year, and Mr. Nicholls from White Tuscan; but the latter thought most varieties would give fair returns if sown on well-worked fallow land. Members reported manurial experiments not very successful, owing to the dry season. Estimated average for district, 5bush. per acre.

PLEURO.—Members wished to know symptoms of pleuro-pneumonia in cattle. [The symptoms of pleuro vary so much that it is almost impossible to accurately describe them. Probably the first noticeable symptoms will be that the animal appears generally out of sorts, keeps apart from the rest of the herd, the eyes are sunken, nostrils dry and hot, and the coat staring. In suspicious cases the animals should be kept apart from other stock, and the Chief Inspector of Stock advised of the symptoms.—GEN. SEC.]

**Port Pirie, January 25.**

Present—Messrs. E. J. Hector (Chairman), E. Stephens, J. Lawrie, G. Robertson, and G. M. Wright (Hon. Sec.).

**FIELD TRIAL.**—Matters in connection with the proposed field trial of agricultural implements, near Crystal Brook, on April 6, were dealt with.

**Lyrup, February 1.**

Present—Messrs. A. Pomeroy (Chairman), E. J. Dwyer, A. Thornett, D. J. Bennett, F. E. Chick, T. Brown, T. R. Brown, A. Weaver, D. Thayne, W. H. Wilson (Hon. Sec.), and two visitors.

**HORSE COMPLAINT.**—Mr. Dwyer reported horses suffering from some complaint causing large swellings under the jaws, which break, and from which there is an offensive discharge. Members wished to know whether glanders had ever been known to exist in the Murray districts. [Glanders has, so far as known, never existed in this colony. The disease described is strangles. Apply hot fomentation, with little carbolic acid added; give nitrate of potash in warm water. Give the animals rest and shelter. If breathing is difficult, steam the nostrils with hot bran and carbolic acid.—GEN. SEC.]

**WLEDS.**—Messrs. Dwyer and Thornett reported having noticed plants of Bathurst bur and Darling pea in the district, and urged members to destroy them whenever seen.

**IRRIGATION.**—Mr. Thornett initiated a discussion on irrigation, and expressed the opinion that fruit trees and vines required a large amount of water, equal to, say, 20in. of rain per annum. Trees and vines nearest the channels always did best. Flooding was preferable to running the water down furrows on each side of the trees. Mr. Thayne said citrus trees especially required plenty of water in this district. Mr. Pomeroy agreed as to the necessity for liberal watering, but in stiff soil care must be taken, or the water would stagnate and destroy the trees. Regular irrigation was necessary.

**ONIONS.**—Mr. Thornett tabled good specimen of White Spanish onion. Mr. Pomeroy tabled the following onions grown from Bureau seed:—White Globe, large and firm; Southport Red Globe, very pretty onion, large, well colored, and firm; Yellow Globe, very good, earliest of all; James's Long-keeping, excellent sample, best for this district.

**Mount Remarkable, February 2.**

Present—Messrs. H. B. Ewens (Chairman), A. Pope, W. Girdham, W. Lange, C. E. Jorgensen, T. P. Yates, S. Challenger, and T. H. Casley (Hon. Sec.).

**DART'S IMPERIAL WHEAT.**—Members reported favorably of this wheat, and considered it deserving of an extended trial in this district. Mr. Lange said he got 10lbs. of grain off a plot 14 sq. yds.

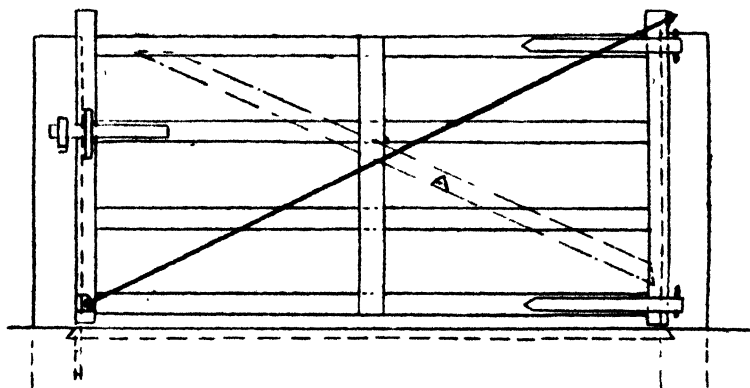
**ENSILAGE.**—Messrs. Casley and Pope tabled pit ensilage of good quality, made from green stuff put in without chaffing.

**FARM GATES.**—The Hon. Secretary read a paper on this subject, of which the following is the substance:—

Every farm should be securely fenced as early as possible, and, where entrances are required, good substantial gates erected that will shut and fasten securely. In vermin-infested districts this is a matter of absolute necessity. To allow the hay wagons, &c., to pass through without the frames coming into contact with the posts, the gates should be 14ft. wide. Gates made in the following way will be found cheap and effective:—Make the hanging stile of 4in. by 3in. oregon, and the dropping stile of 3in. by 3in., of the required height. Three or four horizontal



rails of  $4\frac{1}{2}$  in. by  $1\frac{1}{2}$  in. oregon will be required, and these should be strengthened by a vertical bar in the centre of the same dimensions. The stiles should have  $\frac{3}{4}$  in. by  $4\frac{1}{2}$  in. mortices for the rails to set in, and the rails should have a flush tenon, that is, only one shoulder at the mortice. Take  $\frac{1}{2}$  in. only out of the vertical bar, and bolt to rails with two  $\frac{3}{4}$  in. bolts. At the mortice bolt with a similar size bolt, and from the top of the hanging stile have a  $\frac{3}{4}$  in. bolt to reach to the bottom of the dropping stile, to prevent sagging. This bolt should pass through an iron shoe at the bottom, eye bolts on the rails and through the top of the hanging stile, at the back of which a plate should be fixed. Make a long thread to the bolt, and the gate can then be raised or lowered, as may be necessary. Hinges should be 2 in. by  $\frac{3}{4}$  in., with hooks, as usual; fastener inclined downwards, and made of  $\frac{3}{4}$  in. round iron, passing through two eye bolts, with stop pin between; a long staple, securely driven in to post, to secure the gate. In hanging the gate be sure that it laps the posts, as it will then be protected by the posts when it is open. The gate posts should be substantial, securely put in, and entirely separate from the fence. The timber should be dressed to take paint, given three coats when hung, and one coat every other year. A gate such as described will cost £1 9s., and will last a lifetime if properly looked after.



[Several other sketches of farm gates have been submitted, but all, in my opinion, are faulty, inasmuch as they lack the strut indicated by dotted lines A, which prevents sagging and renders bolts such as shown in this sketch unnecessary.—GEN. SEC.]

### Crystal Brook, February 5.

Present—Messrs. J. C. Symons (Chairman), G. Davidson, E. Pope, E. Dabinett, J. Forgon, and George Miell (Hon. Sec.).

FIELD TRIAL.—Matters in connection with the proposed field trial of seeding implements at Crystal Brook, on April 6, were dealt with.

MANURES.—A member wished to know how to treat decayed farmyard manure and wood ashes with sulphuric acid, to make a phosphatic fertiliser. [Treatment with sulphuric acid does not make a fertiliser phosphatic. The acid is only used with materials containing phosphate in an insoluble form, such as bones, phosphatic rocks, &c., to make the phosphate readily available as plant food. Decayed farmyard manure and ashes, mixed together, are naturally of a soluble character, and require no further treatment.—GEN. SEC.]

### Lucindale, February 5.

Present—Messrs. E. Feuerherdt (Chairman), J. Bourne, E. E. Dutton, A. Matheson, W. Dow, G. C. Newman, S. Tavender, B. Feuerherdt, L. McInnes, J. Nilan, H. Langberg, and H. J. Deeble.

HON. SECRETARY.—Mr. O. A. Witt tendered his resignation as Hon. Sec. owing to removal from the district, and was accorded a vote of thanks for his services. Mr. H. J. Deeble was elected Hon. Sec.

**SEED EXPERIMENTS.**—Mr. Langberg reported his experimental plot of flax a complete failure owing to ravages of grubs. He did not consider the crop suitable for this district. Messrs. Tavender and McInnes reported failure with Cow peas. The Chairman reported good results from *Paspalum dilatatum* and Allhead cabbage. Mr. Bourne had done well with Iceberg lettuce, and Mr. B. Feuerheerdt with Ninety Days' maize, which grew stronger than any other variety tried. Dart's Imperial wheat had done very well.

**HARVEST.**—Members estimated the hay crop for the district at  $1\frac{1}{2}$  tons and the wheat at 12 bush. per acre.

**BUNT.**—Messrs. Tavender and Langberg reported wheat crops very smutty, though the seed was pickled in the usual way, and asked how to account for this.

### Orroroo, February 5.

**Present**—Messrs. E. Copley (Chairman), J. Jamieson, G. Matthews, M. Oppermann, A. Zanker, R. Coulter, jun., and T. H. P. Tapscott (Hon. Sec.).

**OFFICERS.**—Messrs. J. Moody and T. H. P. Tapscott were elected Chairman and Hon. Sec. respectively for ensuing year; a vote of thanks being accorded to the retiring officers.

**ANTS ON FRUIT TREES.**—Mr. Moody said he had tried almost every remedy he had seen mentioned to prevent the ants from climbing the fruit trees and destroying the fruit, but without success, until he placed well-slacked lime round the stems, which proved effective.

**NORTHERN CONFERENCE.**—It was decided to again postpone the annual Conference of the Northern Branches of the Bureau.

### Strathalbyn, February 7.

**Present**—Messrs. M. Rankine (Chairman), W. J. Tucker, L. Dunn, R. Watt, G. Sissons, A. Rankine, W. M. Rankine, H. H. Butler, B. Smith, E. R. Morgan, and J. Cheriton (Hon. Sec.).

**SOUTHERN CONFERENCE.**—The Annual Conference of Southern Branches was fixed to be held at Strathalbyn on Thursday, March 31.

**HOW TO MAKE FARMING PROFITABLE.**—Considerable discussion took place on paper on this subject, read at previous meeting by Mr. Butler (see page 591 February issue). Mr. Watt said Mr. Butler laid particular stress on the necessity for cheap land, but he believed that better prices for their products, which might be secured by combination, was even more desirable. Mr. Morgan agreed. When a man was going on to the land he should carefully consider what return might reasonably be expected from that land, and value it accordingly. If he gave more for it than its productiveness warranted he could not expect to profit. The question of prices for produce was one of supply and demand, and he doubted if a combination could ever regulate prices satisfactorily. Mr. W. M. Rankine differed with Mr. Butler as to merits of merino and crossbred sheep, the cropping of the land, and the question of land rental. The chairman also disagreed with the paper in regard to class of sheep to breed for export, and also in his classing lambs worth 2s. or 3s. in the local market with those which would clear more than double in London. He favored cropping the land for several years in succession, using the seed and manure drill, and would then let the land lie out for a time. Cheap land or high rent was not the main cause in unprofitable farming. Bad farming was a more important factor. He strongly advocated the liberal use of commercial fertilisers and the employment of modern machinery on the farm. Mr. Butler said his argument in regard to price of land was that it should be let at its fair producing value, instead of at double that amount, as in many cases.

**MANURING AND HARVESTING CROPS.**—Mr. E. R. Morgan read a paper on "Drilling with Manure, and Binding and Heading v. Stripping," to the following effect:—

*Manuring with Drill.*—To be a successful farmer nowadays, one must be ever alive to all the latest improvements, both scientific and mechanical, in order to make the farming pay. During his residence at Watulunga, he had always more or less used artificial manures, but it was only in the season 1896-7 that his eyes were properly opened to their true value. He had a paddock which has been cropped for many years, and which up till then had never grown a payable crop. On the worst part of this paddock he broadcasted 1 bush of barley and 1 cwt. of artificial manure per acre. The proceeds grossed £6 2s. per acre, or 32 bush. of grain. It was at the beginning of 1897 that he had a long talk with Professor Lowrie, and that gentleman pointed out to him that with the assistance of a drill there was great economy in the use of both seed and manure. The seed being all evenly planted and covered, none misses germination, and therefore much less is required, while the manure is so placed that it is immediately available for the young plant. Another very strong recommendation for the use of the drill is that it is a most excellent cultivator. Without seeing one at work you can hardly release the pulverising effect it has on the soil. He purchased a drill and put all his crops in with it, and the following results after the awful season we have had are, he thought, sufficient argument that every farmer should immediately procure a drill and use artificial manures at once.

#### RESULTS PER ACRE.

1895-6.	1896-7.	1897-8.
No. 3. Barley. Got seed back.	Not cropped.	Manured and drilled. 18 bush. barley, 10 bush. wheat, 1½ tons hay.
No. 4. Not cropped.	Manured. 32 bush barley.	Manured and drilled. 18 bush. oats.
No. 5. Manured. 5 cwt. to the acre, for cocksfoot clover, no result.	Not manured. 1½ tons of hay.	Manured and drilled. 1½ tons hay off thirty-three acres, 16 bush. wheat off twelve acres.

He had carefully calculated the cost of putting in and taking off these crops, and, with a liberal allowance for wages and horse-feed, the profits amount to over £2 net per acre. It was unnecessary to draw their attention to the fact that during the months of September, October, November, and December the rainfall was next to nothing, but had we been favored with a good September or October rain, he believed the results would have been vastly better. Judging from former years, without the manure and drill the profits would have been nil, while there are very few farmers who can show an average return of 16½ bush. off the same acreage this season.

*Binding and Heading v. Stripping.*—He was led to purchase a disc-header through the belief that, in conjunction with a twine-binder, he could harvest his grain and still have his straw as a valuable fodder for sale and home use. There is an old adage that "You can't both eat your cake and have it," and this is more than true of disc-heading. You certainly do get a lot of the grain out of the straw, but after several years' experience he was of opinion that it was not a payable game. With the use of the stripper he had calculated that, under the very worst conditions, the loss of grain is about 1 bush. per acre, and with the other method it is a great deal more. The first loss with twine-binder and header occurs in the paddock when pitching the sheaves, the amount of this being governed by the evenness or otherwise of the crop and the state of the weather when carted. Other losses occur when taking sheaves to the stackyard, treading on the loads, &c.; but the greatest of all occurs in thrashing. However favorable the weather may be, there are always many short heads in the sheaves which never get thrashed at all. He carefully selected a few of the best-thrashed sheaves he could find and hand cleaned them, with the result that they averaged 3½ ozs. of barley left unthrashed in the sheaf. He estimated that there were 25,000 sheaves in the paddock of twenty-eight acres. He therefore lost, or did not thrash, over 100 bush. At 4s. 6d. a bushel this equals £22 10s. The loss in the paddock and carting he put down in a heavy crop at 4 bush. Taking off 1 bush. against the stripper leaves 3 bush., or 84 bush. for the whole twenty-eight acres, or a total loss of over £40. You may say that what is loss to the grain is gain to the straw, and you have perhaps 30 tons of straw. This is a doubtful asset, whereas your loss of 184 bush. is an immediately negotiable asset, and you still have straw which, with the aid of salt in stacking or steaming, on feeding is almost as valuable as when the grain was left in. According to his figures, which he would be pleased to see refuted, the total loss per acre has been 6½ bush. of barley, and, given that the thrashed straw is worth 10s. a ton more than the stripped, the total loss per acre was 19s. 3d.

There is one more point he would like to draw attention to, and that is that in estimating the crops before stripping or binding he put the barley down as a 25bush. crop, and it only went 18bush., so that he was well within the mark in putting the loss down at 6.5bush. The wheat crop thrashed some friends estimated at 25bush. to 28bush., and it gave only 16bush. Another wheat crop stripped was estimated at 8bush., and yet on being stripped it realised 12bush. This of course was only guesswork, and of small value, but it all points to the conclusion that the loss in twine-binding and heading was even more than he had estimated it at. He had not touched on the relative cost of the two methods, but the members of the Bureau have such an agricultural experience that he considered it unnecessary. It is quite obvious that whether you cart your twine-bound produce to the stack and thrash it at your leisure, or thrash it straight out of the paddock, the expense must be considerably greater than in stripping.

[Will members of Branches who have used the binder and header please give their opinions on these figures. It seems to me that the estimated loss of grain in handling the sheaves is altogether too heavy, while the loss with the stripper is too light. A heavy wind will frequently shake 2bush. or 3bush. per acre out of a fairly heavy ripe crop. Then I think too many sheaves are estimated per acre. In a crop going 30cwts. of hay per acre the sheaves, according to Mr. Morgan's figures, will weigh only 3½lbs each, which is surely very light. The headed straw is valued at 10s. per ton more than stripped straw, but, taking Mr. Morgan's figures, there are 3 tons of grain in the 30 tons of headed straw, or say 3½bush. to the ton, which at 4s. 6d. per bushel, make the grain alone worth 16s. 6d. per ton of straw.—GEN. SEC.]

### Kanmantoo, February 4.

Present—Messrs. Thos. Hair (Chairman), J. Hair, J. Mullins, J. Downing, P. Lewis F. Lehmann, W. G. Mills (Hon. Sec.).

**MANURING.**—Several reports were given as to results of use of commercial fertilisers last season. The Chairman said his experiments paid for the cost and the trouble, although he went to the expense of hiring a seed drill. Mr. Lehmann said his brother on the Murray Flats had been experimenting with different fertilisers, and had best results with colonial superphosphates. The Chairman stated that a field of about forty acres at Monarto, which had come under his notice, gave a return of 4bush. per acre, while about three acres which was manured with K.I. guano as an experiment yielded 9bush. per acre. Another paddock alongside of exactly similar soil, but unmanured, only gave 3bush. per acre.

**DART'S IMPERIAL WHEAT.**—Mr. Downing tabled a few ears of this wheat raised from Bureau seed. From a small packet of seed he got a yield of 2bush., the grain being of good quality and the ears large.

### Colton, February 5.

Present—Messrs. P. P. Kenny (Chairman), A. S. Bartlett, J. L. Dennison, A. A. Stephens, W. A. Barnes, M. S. W. Kenny, J. Shipard, W. McElder, and R. Hull (Hon. Sec.), and two visitors.

**WHEAT EXPERIMENTS.**—Mr. A. A. Stephens, of the Colton Public School, read the following paper on this subject:—

The Colton Branch of Agricultural Bureau having early in the year expressed a wish to test the yields of the different wheats grown in the district, Mr. P. P. Kenny (the Chairman) kindly offered the school board a piece of virgin ground adjoining the north side of the school if they would pay expenses of transfer and fencing, which they agreed to do. The soil, being similar to other land under cultivation in the district, was most suitable for the purpose. Early in April the ground was ploughed by the school boys and myself

to a depth of about 5in., and divided into plots, each 25 sq. yds., with a space of 1yd. wide between each plot. It was harrowed before sowing, in order to make a fine bed to receive the seed. No manure was applied to the land. Most of the seed wheat was obtained from the farmers of the district through the children attending the school. Each plot was allotted to two boys, and the greatest interest was taken by them in their work. The wheat was weighed out, and 40zs. sown in each plot, being approximately 48lbs. to the acre. It was drilled in in sixteen rows to each plot, the rows being 1ft. apart. All the wheat was pickled with blue-stone before sowing. The first lots were sown on April 29, which is about the proper time to sow in this district. The kinds sown were—African Baart, Bartlett's Rust-resistant, Steinwedel, Purple Straw, Marshall's No. 3, White Tuscan, Club Head, Prolific Purple Straw; and later—on June 3—Dart's Imperial, King's New Early, Allora, and others.

There was no rain until the end of May and in June, which brought the wheat up.

On July the 22nd, and each month until harvesting, each boy wrote a report on his plot. The plots sown with carefully selected grains came up the most regular, and proved that if only good sound seed is sown 48lbs. to the acre is far too much. It was most interesting to note the difference in the look of the various kinds of wheat—some standing upright, while others crept along the ground.

From August until the wheat was ripe we had little or no rain; in fact the district generally experienced one of the driest seasons known for years, but in spite of the absence of rain, the wheat held its own, especially the earlier varieties, though the average height was not up to other years, being only about 2ft high.

When the wheat was about 1ft. high the boys hoed half of each plot, and the difference in the height of that hoed and not hoed was astonishing. We planted 100 grains of "Velvet Purple Head," the product of one ear, which was admired by all who saw it growing for its evenness in growth and perfectness of the heads. It was sown under the same conditions as the rest, and yielded 390 heads, well filled. We also sowed a plot (broadcast) of Medea (bearded solid straw) with Purple Straw mixed, and believe the mixture makes good hay. The straw of the Medea is more readily eaten by horses and cattle than the straw of other wheats.

We tried an experiment in sowing the seed at different depths, viz., 1in., 2in., and 6in., and found that the deep sown rooted a second time at the same distance from the surface as the shallow sown, but grew stronger and taller than the latter.

The first varieties to come into head and ripen were King's New Early (bearded) Steinwedel and African Baart (bearded). The later kinds were more or less shrivelled, caused no doubt by the hot winds we had just when they were in flower. We reaped the early wheat about the middle of November, and though King's Early was one of the latest sown it was the first to ripen, and yielded the heaviest, viz., 20½bush. to the acre. The Steinwedel seems to be the farmers' favorite. A great fault with it is that it is a bad wheat to shake out.

In the same garden we also sowed ten sorts of grasses, the seed of which was obtained from the Central Agricultural Bureau: but, owing to the exceptionally dry season, they proved a total failure.

The members of the Colton Branch of the Agricultural Bureau visited the plots on November 6th, and were well pleased with what they saw, and were unanimous that the earlier sorts looked the most promising, especially King's Early.

The yield per acre of the different early varieties was as follows:—King's New Early, 20½bush.; Dennison's Purple Straw, 18½bush.; African Baart, 17½bush.; Bartlett's Rust-resistant, Hull's Purple Straw, White Tuscan, and Club Head, 14½bush. each; Steinwedel, 13bush.; Marshall's No. 3, 11½bush.; average, 15½bush. The later sown varieties did not yield so well.

A discussion ensued on the depth to sow wheat. Mr. Stephens pointed out that although the seed when planted 4in. deep put forth adventitious roots near the surface, it stood the drought better than the wheat sown about half an inch deep. Mr. Higgins said that, as a result of careful observation during the past seven years in this district, he was convinced that wheat ploughed in and left until after rain to harrow down did better than if sown and harrowed at once in the ordinary way. When the seed is ploughed in the plant roots deeper, and the harrowing after rain leaves the soil in a mellow state and does not injure the plants. He intended to put in forty acres this way, and hoped other members would try the experiment. Mr. Barnes said his experience was that harrowing the crop after it is up has a very beneficial effect. Mr. M. S. W. Kenny asked which were the best varieties of wheat for hay, and whether barley made good hay. Members did not consider barley suitable for hay;

Red and White Tuscan and Medea wheats were mentioned as making the best of hay. Mr. Barnes said he found Medea made excellent hay, and the horses were very fond of it. He had stacks of Purple Straw and Medea, and found that a horse that was continually getting at them always went for the latter. Members, in reply to question as to best wheat for scrub land, considered it largely depended on the land and the season.

### Port Lincoln, January 21.

Present—Messrs. S. Valentine (Chairman), J. D. Bruce, W. E. Goode, J. O'Shanahan, J. Telfer, and W. Laidlaw.

**RABBIT DESTRUCTION.**—Mr. Bruce stated that Mr. R. Puckridge had been very successful in destroying rabbits by means of the hearts of the yaccas cut into 6in. length and smeared lightly with toxo.

**PICKLING WHEAT**—Mr. Laidlaw read a short paper on this subject. He considered the prevalence of bunt in the crops was due to carelessness in treating the seed. He had only had his crops affected twice, and in each case it was due to not dressing the seed (which was smutty) thoroughly. He used either Dollman's Farmers' Friend, bluestone, or lime for pickling. With the two former he dissolved a pound in sufficient water to thoroughly wet four bags of seed, taking care to mix the seed thoroughly. As soon as the seed is dry, it can be sown. He used lime in the following way:—Make a boiling hot lime-wash, using good new lime, and mix the seed in it until thoroughly wetted. Bag at once. The bagging causes the seed to get very hot, and is more effective than allowing the seed to dry unbagged; dressing with lime takes longer, but the seed comes up sooner and stronger than seed treated with the other pickles. To prevent crows taking the seed, dissolve about a pint of coal tar in water for three bags of seed. Members agreed that pickling with bluestone, if properly done, was effectual in preventing bunt. Mr. Good said a farmer at Port Bolingbroke had sown wheat wet from the pickle and harrowed it in at once, with the result that the crop was very "smutty." About four acres was left unharrowed until the following morning, and this was quite free. Mr. O'Shanahan considered this due to the pickle being absorbed in the soil.

**ANNUAL SHOW**—It was decided not to hold the annual produce show on account of the unfavorable season.

### Mount Bryan East, February 5.

Present—Messrs. H. Wilkins (Chairman), T. Wilks, J. Prior, T. Best, H. W. Collins, W. Bryce, J. Honan, W. H. Quinn (Hon. Sec.), and two visitors.

**DAIRYING.**—Considerable discussion took place on this subject, and the use of the separator in private dairies received considerable attention. Messrs. Wilks and Brice spoke very strongly of the value of the separator, and stated they get three times as much profit in the hot weather from the separator butter as under the pan system.

**CHAIRMAN.**—Mr. T. Best was appointed Chairman for the ensuing year.

### Pyap, January 28.

Present—Messrs. K. F. Huselius (Chairman), T. Teale, T. Smith, C. Billett, J. Holt, A. J. Brocklehurst, H. Mills, W. C. Rodgers (Hon. Sec.), and one visitor.

**TOMATOES.**—Members reported tomato crop almost a complete failure, the fruit rotting instead of ripening. The Chairman reported that his plants failed to set fruit.

**ONIONS.**—Mr. Brocklehurst tabled onions grown from Bureau seed. Brown Globe were of very good quality, and the best he had seen for marketing. White Globe was large and good. His experience was that onions did best if sown in the field and not transplanted.

**HERBS.**—Members asked for information concerning the cultivation and preserving of culinary herbs. [Grow them in good loose, rich, deep soil, and when in flower cut and dry the herbs in a shady place, laid on cloths and quite thinly. Then rub off the leaves, reject all twigs and stems, and pack tightly for sale.—*GEN. Sec.*]

### Murray Bridge, February 12.

**Present**—Messrs. W. Lehmann (Chairman), F. H. Wurm, J. J. Stecker, W. Schubert, J. G. Jaensch, H. Block, B. Bretag, F. W. Wundersitz, R. Edwards (Hon. Sec.), and one visitor.

**WHEAT EXPERIMENTS.**—Mr. Wundersitz tabled fair sample of Twenty Weeks Wheat, averaging 8bush. per acre. Mr. Block reported that from 1oz. each of Pride of Barossa and Gravestock's Frampton Wheats, sown in 1896, he obtained 2½lbs. of grain of each variety. This, sown in 1897, yielded 11lbs. and 13lbs., respectively, of good grain. One ounce of Dart's Imperial wheat, sown in 1897, yielded 2lbs. fair grain.

**Pigs.**—The Chairman read the following paper:—

Rearing and fattening pigs on a dairy farm is a profitable undertaking for the farmer, providing it is carried out on the best principles possible; otherwise it may turn out a useless waste of food and labor. Pigs consume all waste on the farm, such as skim milk, fallen fruit, unsaleable potatoes, drake, &c.—articles which as a rule have no selling value, but if fed to pigs can be made to turn out as profitable as the principal products of the farm.

To begin with, you must choose pigs that have not been starved in their youth, and should be a cross with the Berkshire, or nearly pure Berkshire, if you have an abundance of feed. A Berkshire boar mated with a well-shaped sow, suitable for breeding, not necessarily of any pure breed, would produce a good class of pigs. The sties should be roomy and comfortable, facing east, to ensure warmth of a cold winter morning, so that the sun when rising would shine into the part where they have their lair. This is essential for young pigs, as they suffer from the cold. A yard could also be constructed to allow for exercise, as small wet sties will cause pigs to become cramped and crippled in their legs.

It is also necessary for the farmer to grow certain kinds of products to help to fatten pigs with, besides the waste, such as barley or peas, or anything that will give a good return in his particular district, and would not exhaust the soil to the same extent that growing wheat would. Heavy crops of barley have been grown in and around this district in good seasons. This could be stored in barns, and last for several years for pigs' food, and would do away with buying expensive food in bad seasons. A successful farmer in this district purchased a well-bred Berkshire boar, a prize-taker, at the Mount Barker Show, the progeny being a nice evenly grown class of pigs. When the young pigs are about five months old they are shut up and fattened on skim milk and barley; at seven months they are fit for market, and weigh from 100lbs. to 140lbs., and being well fed and fine pigs, he gets top prices. The more careless farmer lets his pigs roam about in grass paddocks, feeds them with skim milk when he has got some, and manages to get some fat when the grass is green and his cows are all in milk; but, being grass-fed pigs, they make poor quality bacon, and when their heads are cut off very little is left of them; consequently the bacon-curers shun his pigs, and he has a difficulty in getting rid of them. The thrifty farmer shuts his pigs up in a small, badly protected sty, he bundles them all in, large and small; consequently the larger ones get nearly all the feed, and the small ones starve. Having been informed that such a farmer had some fat bacon pigs to dispose of, I went to inspect them, and found them up to their knees in muck, the larger one feasting on part of a frosh born calf, the smaller ones turning over one of their dead mates, looking for a part to begin on. Coming there about feeding time, the owner was about to give them their mid-day food, which consisted of two kerosine tins of swamp water with a few handfuls of pollard added. He never succeeded in getting them fat, but had to kill and eat them himself to save buying more pollard. Before getting through all of them, he and his wife were laid up for weeks with acute indigestion.

**Bute, February 1.**

Present—Messrs. A. Schroeter (Chairman), H. Schroeter, W. H. Sharman, M. Stevens, J. W. Hall, W. Sluggett, E. Ebsary, J. J. Chapman, and D. Green (Hon. Sec.).

**CONFERENCE OF BRANCHES.**—Members agreed to co-operate with Pine Forest Branch in holding a conference of Northern Yorke's Peninsula Branches on March 23.

**CHANGE OF SEED.**—Lipson Branch wrote that the members, being convinced of the benefits to be derived from change of seed wheat, suggested that a regular system of exchange of seed should be established between the Branches of the Bureau. Members were agreed as to the benefit derived from exchanging seed, but had already made their arrangements for the coming season.

**Meadows, February 6.**

Present—Messrs. J. Catt (Chairman), T. B. Brooks, G. Ellis, G. Usher, G. Rice, T. Usher, H. V. Wade, W. Nicolle, W. A. Sunman (Hon. Sec.), and a number of visitors.

**CONFERENCE.**—Mr. W. Pearson promised to prepare a paper for the Southern Conference, to be held at Strathalbyn on March 31, on "Cultivation of Peas, and their Value as a Farm Product."

**BRANCH SHOW.**—It was decided to hold the annual produce show in connection with the Branch on Wednesday, March 16.

**FRUIT CROP.**—Some members stated they were obliged to pick their keeping apples and pears before they were ripe, in order to save them from the crows and parrots. The locusts have even attacked soft fruits, such as peaches, &c., this year. The potato crop is very poor, while the tomatoes have been scorched on the plants.

**Dowlingville, February 11.**

Present—Messrs. R. A. Montgomery (Chairman), J. Phelps, J. Burkin, T. Illman, R. Foggo, G. Inkster, and J. L. Broadbent (Hon. Sec.).

**BRANCH CONFERENCE.**—Members regretted being unable to attend Conference of Branches, to be held at Alford on March 23, owing to being busy water-carting, and to the distance to travel.

**MANURING.**—Mr. Foggo said he had had no better results from use of commercial fertilisers than from mixture of burnt dirt and farmyard manure. He thought this due to the dry season and to the seed being drilled in too deep. Members were of opinion that coating the seed with Thomas phosphate and superphosphate after pickling was injurious, as seed so treated had in every case not germinated as well as seed not treated.

**Nantawarra, February 7.**

Present—Messrs. C. Belling (in chair), A. L. Greenshields, R. Uppill, Jas. Nicholls, T. Dixon (Hon. Sec.), and two visitors.

**BRANCH CONFERENCE.**—Members are unable to attend Conference of Branches at Alford on March 23, owing to distance to travel.

**WHEAT EXPERIMENTS.**—Mr. Nicholls reported favorably of Dart's Imperial wheat; it was, however, rather late for the district. The Hon. Sec. had got from a small strip of this wheat a yield equal to 20 bush. per acre.



Mr. Belling reported having seen wheat which had been cut rather ripe for hay, chaffed up and the grain winnowed out. It was of good quality, and no more grains cut than a bad stripper would crack.

**MANURING.**—Mr. Belling reported that his experiments with seed and manures put in with the drill had paid him well. The land treated was a fair average of the farm. No. 1 plot, sown with 40lbs. Steinwedel wheat and mixture of 80lbs. English super and 32lbs. wood ashes per acre, yielded 12½ bush. per acre. No. 2, treated with Thomas phosphate, 1cwt. per acre, averaged 6bush. No. 3, drilled in without manure, 3½ bush. These were on very light soil, with limestone rubble subsoil. On stiff red soil, mixed with sand in patches, 90lbs. English super returned 13½ bush.; 1cwt. Thomas phosphate, 10½ bush.; broadcast and unmanured, 5½ bush. Forty pounds of wheat was in each case put in with the drill, and 45lbs. when broadcasting. The season was exceptionally dry throughout the spring, and his neighbors were often inquiring as to how the manured wheat was standing the dry weather. The result was very favorable, as the wheat suffered very little, and to be certain on this point samples of each plot were sent to the agent at Port Wakefield, who reported the samples weighed as follows:—Wheat manured with super, 62lbs. to the bushel; manured with Thomas phosphate, 62½ lbs.; broadcasted, 62½ lbs. to the bushel. From these figures, and bearing in mind that the year's rainfall was only 10·730in., of which less than 2in. fell after August 31, it will be agreed that wheat lightly manured with phosphate will not suffer from dryness more than unmanured.

### Port Broughton, February 7.

Present—Messrs. R. W. Bawden (Chairman), George Pattingale, W. Fowler, W. Bennier, I. Rayson, and S. M. Bawden (Hon. Sec.).

**CONFERENCE.**—In regard to the proposed Conference of Northern Yorke's Peninsula Branches at Alford, on March 23. members of this Branch thought the place of meeting not suitable; it should be holden at Bute or Kadina, and a moonlight night should have been selected in place of the 23rd. Messrs. R. W. Bawden, W. Tonkin, W. R. Whittaker, W. Bennier, J. Barclay, and I. Rayson were delegated to attend.

**EXHIBITS.**—By Mr. W. Tonkin—Red Straw wheat, 3ft. 6in. high, yielding 8½ bush. per acre, drilled with English superphosphate. Similar wheat drilled without fertiliser, alongside, yielded only 4bush. per acre. He applied 1 ton fertiliser on twenty-five acres. He thinks 80lbs. per acre quite enough for land in this locality. By Mr. W. Bennier—Three sorts of apples, and some peaches, pears, and nectarines, grown by himself, without any watering. Fairly good samples.

### Quorn, February 10.

Present—Messrs. J. B. Rowe (Chairman), John Cook, R. Thompson, C. Potter, and A. F. Noll (Hon. Sec.), and one visitor.

**FLOUR MILL.**—Arden Vale Branch inquired *re* establishing a flour mill at Quorn on co-operative principles. Members agreed that farmers generally would benefit considerably were such a mill established; but it would be better to await more favorable seasons before attempting the undertaking.

**EXPERIENCES WITH SEED DRILL AND FERTILISERS.**—Mr. John Cook read a paper, as follows:—

In giving my experience of drilling *versus* broadcast sowing it will be necessary to refer back to the year 1867, at which time I was farming on what was then known as the Adelaide plains, north of the River Torrens, between Hindmarsh and the Reedbeds, on the

sections now laid out in blocks and largely built upon; in fact, the block that the Hind-marsh tram stables now stand on was portion of the land I experimented upon; I say experimented, because at that time drilling was almost an unknown method of sowing wheat in the colony. The drill I obtained was one sent out or imported by Messrs. Tuxford (who were then large importers of English-made farming implements), with the view of getting the drill introduced into the colony. The drill, however, lay so long in their yards that our climate took the usual effect upon machinery constructed mostly of wood, and I had some difficulty in getting it into working order. I was, however, determined to try an experiment to which I had given some thought, which was to give sheep manure a fair trial against bonedust, the only manure that was used to any extent at that time. Guano was used, but not to anything like the extent of bonedust.

The plan I adopted was to place a tarpaulin upon the headland, I then took five bucketfuls of well riddled sheep manure and mixed one bucketful of seed, mixing thoroughly before putting it into the drill, preferring to mix as soon after picking as possible, the dampness of the pickle causing the finest portion of the manure to adhere to the seed. I must here explain that the drill I used, being known as the "cup drill," did not rub off the manure from the seed, giving the seed immediate benefit of the manure as soon as it germinated. This plan I found after several trials to be preferable to mixing and sowing the seed when dry. This plan I adopted for four years with very great success; the first year I put in sixty acres of very poor worn and dirty land that had been cultivated for at least sixteen or eighteen years, using the sheep manure as already described; and from the first appearance of the plant it could be plainly seen what immense advantage the drilled and manured plant had over that sown broadcast, and which for a considerable time successfully combated the progress of the wild oats, giving the field the appearance of a perfectly clean field viewed from a distance; and not until the wheat plant ceased growing and the seed commenced to mature did the oats manage to put in an appearance, and certainly not before the wheat was quite ripe enough to have been cut with the binder, had such machines been known at the time. I mention this to show had I wished to have cut the crop for wheat it was sufficiently matured before the oats could have interfered. I, however, being largely in the hay trade, cut the crop, one of the best I ever cut for hay, and that off what I before stated was much worn land.

After adopting the above method for four years, I left the old farm for fresh fields and pastures new in the newly opened districts in the North, and located myself on the Rocky River in the Booyoolie area. Before giving my experience there, I may state that in experimenting with bonedust and sheep manure I saw no appreciable difference between the two manures, but must admit that the bonedust manufactured in those days was much inferior to that now in the market; and I must further state that a portion of land that I sowed the bonedust on broadcast was not to be compared with that drilled in, giving the same amount of bonedust to the acre. It may be asked how, after such success with the drill, I abandoned the system, the explanation being that upon taking possession of the farm in the Booyoolie area I, like most others, not being satisfied with the moderate amount we were farming in the old districts of, say, 200 or 300 acres, aspired to as many thousands, and upon the new and clean rich lands in the North got such splendid returns that I abandoned the drill (with which I could not put in more than ten acres per day with a nine-tine drill) for the broadcast sower, with which I could seed 100 acres if pressed. The return from the first crop sown broadcast gave me a return of 40bush. per acre, and for the following eight years I had an average of 30bush. per acre. That was one of my principal reasons for dispensing with the services of the drill. Now, however, as the land has grown poor by constant cropping year after year, I am firmly convinced that it will be absolutely impossible to continue in the old groove without returning something to the land in lieu of that of which we rob it, and I know of no means of doing so better than by the drill and patent or other manures.

Now I will refer to my experience of a more recent date, viz., that of last year, and although it was not such as that of 1867 to 1871 (caused solely by the want of moisture), it was sufficiently encouraging to warrant my saying and believing that, as the binder will eventually supersede all other means of taking off our crop, so will the drill supersede all other means of putting it in.

As most of you are aware, in the beginning of last season Messrs. Norman & Co. sent into this district an expert with their "Superior" seed drill, and offered to put in a limited number of acres with the drill and their patent manures. Of this offer several farmers availed themselves, with the result that most of them, indeed, I may say all, are satisfied that with anything like a reasonable rainfall the drill, with a judicious application of manure, will be of the greatest benefit to farmers where their land has become exhausted by continuous cropping. In my own case, this year I put in 250 acres with the drill (being successful in obtaining the drill above mentioned), using sheep manure and Thomas phosphate and bone phosphate. I did not notice any very marked difference in the manures used, but should certainly prefer Thomas phosphate. The differences, however, in the

crops drilled in with the manure were much better than those drilled without manure; the latter also showing much better than that sown broadcast. When using sheep manure I prefer that it should be as new as possible, not being in favor of the "well rotted" theory. The plan I follow when sowing early and the land is dry is to sow not less than 2in. deep, so that the first slight shower will not cause the seed to germinate and then die off or malt should a spell of dry weather follow. When the land is moist and little fear of much dry weather following, then I consider 1in. below the surface quite sufficient.

Some of the many advantages I have proved the drill to possess over the broadcast sower are in putting the seed and manure in together; the seed after germinating gets the immediate advantage and benefit of the manure, being there at the right time and right place, and we are bound to admit there is great advantage in getting a good start either in animal or vegetable life. With the wheat plant if it gets a good start, aided by manure, I have found that it is capable of holding its own, and sometimes managing to distance the wild oats—it greatest enemy. Another advantage of drilling is in the saving of seed, when at least 12lbs. of seed can be saved per acre, or, say, 20bush. on every 100 acres sown (which at last year's price means £6 upon every 100 acres sown). There are many other advantages I could point out in favor of drilling, but find I have prolonged my remarks to a much greater extent than I at first intended.

### Penola, February 12.

Present—Messrs. D. McKay (Chairman), Dr. F. Ockley, W. Miller, E. A. Stoney, J. Fowler, S. B. Worthington, H. Ricketts, J. A. Riddoch, and T. H. Artaud (Hon. Sec.)

**SOUTH-EASTERN CONFERENCE.**—Most of the members notified their intention to be present at the Conference of South-Eastern Branches, at Bordertown, on March 16, and to take samples of produce and home industries for exhibition.

**RAINFALL.**—Recorded by Hon. Sec. October, 1897, 1·670in.; November, 1·110in.; December, 0·210in.; total for 1897, 21·615in. For January, 1898, 0·190in. Average for thirty-five years, 26·993in. Highest rainfall, 1863, 40·95in.; lowest, 1887, 16·35in.

**EXHIBIT.**—Hon. Sec. tabled a very fine specimen of Pond's Seedling Plum, grown by Mr. J. Darwent, at Coonawarra Fruit Colony.

**LOCUSTS.**—Locusts are doing much injury to soft fruits and various plants and trees. Mr. E. A. Stoney said he had tried several supposed remedies ineffectually. Mr. McKay attributed the increased number of locusts to the mild winter. Frosty weather checked their increase. [It has often been asserted that the locusts can be poisoned in myriads with the pollard, treacle, and Paris green mixture. Use 4ozs. Paris green, 4pts. treacle. 25lbs. pollard, enough water to make a hard paste, and break into lumps the size of a cob-nut. A remedy adopted in Cape Colony is to dissolve 16ozs. washing soda in 1gall. of water, then add 8ozs. white arsenic. When this is dissolved add 4lbs. sugar and 4galls. more water. Mix chaff with this till all is absorbed, and scatter the chaff where the locusts are gathered.—GEN. SEC.]

**HOMESTEAD MEETING.**—On the invitation of Captain J. Fowler, it was decided to hold the next meeting of the Branch at his orchard, on Coonawarra Fruit Colony (late Penola Fruit Colony), after an inspection of the various orchards. An invitation from Mr. J. A. Riddoch to visit the Coonawarra wine cellars, and to witness the wine-making operations, was also accepted.

**LUNG AND INTESTINAL WORMS IN SHEEP AND CATTLE.**—A very interesting article upon this subject, as published in the *New Zealand Farmer*, was read by the Hon. Sec., as follows:—

The researches of Professor Brown in reference to "Parasites of the Lungs of the Sheep," and of Professor McFadyean, Principal of the Royal Veterinary College, London, relative to "Parasitic Gastro-enteritis in Lambs and in Cattle," have enabled farmers to obtain investigations by the best veterinary talent at much less expense than if they had to employ it themselves. These long and patient investigations have solved the problem of the mysterious, and in recent years more frequent, recurrence of certain acute diseases among flocks and herds

about the origin and nature of which stockowners have held widely conflicting opinions. Even when local veterinary surgeons have been consulted, as has been the case in the United Kingdom, respecting exceptional and apparently unaccountable mortality among stock, the experts have been at fault, and unable to arrive at any definite conclusion. Such precisely were the circumstances attendant on outbreaks of disease among lamb flocks in Lincolnshire, Leicestershire, and other English counties in the autumn of 1894, followed by similar attacks in the autumn of 1895, occasioning in both seasons an alarming number of deaths. Local veterinary surgeons, who had personally investigated the circumstances attending the deaths, and inquired into the system of management of the stock, were in disagreement both as to the origin and exact nature of the disease. This, and the extensive losses reported, determined the authorities of the Royal Veterinary College to institute an adequate investigation of the subject, and in anticipation of a recurrence of the disease in the autumn of 1896, in October last a circular was addressed to members of the veterinary profession practising in Lincolnshire and Leicestershire, requesting them to co-operate in the investigation by sending dead lambs or their viscera to the college laboratory in the event of their being consulted regarding lamb disease. This request was soon followed by the delivery of the specimens asked for, and during the latter half of October and the first half of November entire carcasses or viscera from about forty fatal cases reached the laboratory. Again, in the early part of 1896 application was made to the college authorities by a member of the Royal Agricultural Society for an investigation into a serious disease which had been for many years prevalent among the cattle on his farm. The first fatal case occurred in the year 1879. From that time onward the farm was never free from the disease, and the number of cases gradually increased until in 1895 fourteen animals died. In January, 1896, two animals in the last stage of the disease were sent to the Royal Veterinary College in order that they might be submitted to post-mortem examination. These animals were in very emaciated condition, and they had profuse diarrhoea; they presented the appearance of animals in the last stage of tuberculosis, but they had no cough, and physical examination gave no evidence of the existence of that disease. The following abbreviation of Professor McFadyean's reports on "Parasitic Gastro-enteritis in Lambs," published in the Royal Agricultural Society's Journal, and on the same disease (Disorder of the Stomach and Intestines) in cattle will furnish important information it is necessary that owners of stock should be possessed of.

A knowledge of the symptoms of the malady which occasioned heavy losses in the lamb flocks of the English Midland Counties in the autumns of 1894, 1895, and 1896 was gathered from the reports furnished by veterinary surgeons, who forwarded animals or viscera for examination, and from personal examination of diseased lambs in three different flocks. The most constant symptom was scouring, and this was seldom or ever absent in animals in which the illness lasted for a few days. The diarrhoea was accompanied by rapid wasting and loss of appetite. Abnormal thirst was frequently noted, and in some cases the lambs displayed an inclination to lick sand or earth. This morbid propensity appeared to have been present much more frequently than it was noticed during life, for the presence of sand and earth in the stomachs was very generally found at the *post mortem*. The temperature was generally above normal, varying from 105° Fahr. to 103° Fahr. Cough, as a rule, was not a symptom that had attracted the notice of the owner or shepherd. In some cases the course of the illness was very acute, the animals dying within twenty-four hours; but, as a rule, the lambs were more or less ill for several days or weeks. The mortality varied from 5 per cent. to 20 per cent., and in some flocks all the lambs appeared to be more or less affected. On one of the farms visited only ram lambs were attacked, but these had not been pastured with the ewe lambs for some months previously. On all the farms from which specimens had been obtained the disease was confined to the lambs, the ewes and other sheep over a year old escaping.

In regard to the cause of the disease, the laboratory record of over forty *post-mortem* examinations shows that in a large proportion of cases two or more species of parasites were found in association, and it became necessary to inquire how far these were severally responsible for the illness and death of the animals in which they were found. Three of them—viz., the *Strongylus rufescens*, the *Strongylus contortus*, and the *Trichocephalus affinis*—certainly cannot have any importance assigned to them in this connection. The first of these was only found in one instance, the second was encountered in the fourth stomach in a few cases, while the third was present in the large bowel in eighteen cases, but in only six of these were the parasites numerous. The *Strongylus filaria* (white hair-worm) was present in thirty of the cases, and in eighteen of these the lungs were the seat of lesions that were presumably excited by it, and which must have materially contributed to make the animal ill. Owners and shepherds did not know what the deaths were due to, but they knew from former experience of the disease that the "lung worm" was not the cause. Furthermore, the most constant lesion in the disease which prevailed in the autumn was in the stomach, and the most constant symptom diarrhoea, and for neither of these could parasites present in the air passages be held responsible.

The discovery of the true cause of the disease is to be credited to the Veterinary College authorities, who in the course of the *post-mortem* researches, ascertained the presence in the fourth stomach, its mucous membrane and contents of hosts of "small nematode worms."

The term means that the worms belong to the new species fully described and illustrated in the printed report. The worms in question are so small that they may be easily overlooked, and indeed they are almost certain to be overlooked if the person making the *post-mortem* examination relies upon a naked-eye inspection of the stomach and its contents. Even when present in thousands in the muddy contents of the stomach it is impossible to detect them with the naked eye, unless a very thin stratum of the liquid is examined, but they may be easily made out when a little of the contents or a scraping of the lining membrane of the stomach is suspended in water and examined in a flat-bottomed glass dish. When taken from the stomach of a recently diseased animal they display active movement, but when putrefaction of the carcase sets in they soon die and shrivel up. If some time has elapsed since the animal's death the worms are generally most numerous in the stomach contents. In the perfectly fresh stomach they are generally in the greatest number on the lining membrane, but even then they may be present in hundreds in the liquid contents. Since it was announced at a meeting of Council of the Royal Agricultural Society in November of last year that the cause of the disease then prevalent among lambs was this hitherto undescribed species of nematode worm in the fourth stomach, it was suggested that this worm is merely an immature form of the *Strongylus contortus*, a well-known parasite, often noted to be the cause of epizootic gastritis in lambs both in the United Kingdom and abroad. Professor McFadyen at some length in his report exposes the falsity of this idea, but this phase of the subject, though specially attractive for scientists, has little interest for farmers.

In reference to the medicinal treatment of diseased lambs, Professor McFadyen says:—"It must be reluctantly confessed that while the cause of this form of lamb diseases is plain enough, the curative treatment of it yet leaves much to be desired. In each of the three last autumns the afflicted flocks were treated with a variety of drenches, and so far as could be ascertained these were about equally unsuccessful in saving the lives of the lambs that were already ill before treatment was begun. This is no reproach to the veterinary surgeons, who have an admitted difficulty in killing internal parasites that are more resistant to poison than the animals that harbor them." Advantage was taken of the opportunity presented by the *post-mortem* examinations made at the Veterinary College to test the killing power of some of the agents in common use against worm diseases in calves and lambs. The results of these experiments are calculated to give a shock to the confidence which has been hitherto pretty generally placed in some of the parasiticides mentioned. Turpentine is a sheet-anchor in the treatment of diseases caused by the round worms, and there appears to be a considerable body of clinical evidence in its favor; but it has to be observed that in the strength of 2½ per cent. with milk it appeared to have no serious effect on white thread worms (*S. filaria*) that had been immersed in the twelve hours. Even with double that strength it had no apparent effect after a two hours' exposure. In practice it would be impossible to ensure a two hour's contact between worms in the stomach of a living sheep and a 5 per cent. solution of turpentine, because of the necessity of considerably diluting the turpentine for administration and the rapid absorption that sets in as soon as it comes in contact with the mucous membrane of the stomach. It need hardly be pointed out that if the circumstances are so unfavorable for the ensuring of contact between a sufficiently concentrated solution of turpentine and stomach worms, the difficulty is immensely greater in the case of parasites lodged in the bronchial tubes or lung tissues.

Arsenic also appears to be a very weak parasiticide, since a twelve hours' exposure to Fowler's solution diluted with forty times its bulk of water left the white thread-worms still active. This represents a strength of 1 gr. in 100 ozs., and a stronger solution could not in safety be kept in contact with the mucous membrane of the stomach for anything like twelve hours. Besides, it must be mentioned that even undiluted Fowler's solution (4 grs. to 1 oz. of liquid) did not kill stomach worms with a two hours' exposure, and 10z. of Fowler's solution is a poisonous dose for a lamb.

Carbolic acid and chloroform appear to be much more injurious to adult nematode worms than turpentine or arsenic, but less active than lysol (a watery solution of tar oils). In each of the series of experiments a 1 per cent. solution of this substance in water proved fatal to worms in ten minutes, and since half a pint of such a solution may with safety be given to a lamb of six months old, the experiments hold out strong hopes that lysol may prove valuable in the treatment of parasitic gastritis. It has to be observed, however, that while the experiments discredit the employment of turpentine, arsenic, and carbolic acid in the treatment of animals already ill from hoose or parasitic gastritis, they do not prove that these agents are valueless when repeatedly administered in safe doses to apparently healthy lambs as a preventive. For the cure of animals already ill an agent strong enough to kill the adult sexually mature worms is required, and there can be no doubt that the resistance which such worms offer to solutions that are strong poisons to the host, is ascribable to the difficulty with which their chitinous integument is penetrated by the solutions. It is possible, however, that the younger worms when they are first taken into the stomach are more easily killed owing to their having a thinner integument. Repeated doses of turpentine may thus be capable of preventing an attack of parasitic gastritis, though powerless to cure it.

Consideration is next given in the report to the means of prevention, which is proverbially

better than a cure. The cause of the disease is, in the narrowest sense of the word, the presence of the parasites described in the fourth stomach, but with circumstances that favor the introduction of the worms into the alimentary canal. In the first place it must be understood that a single nematode worm, or even several, would have no appreciable effect on the general health of the lamb, because indefinite multiplication of the species does not go on within the body. A single impregnated female worm may produce thousands of eggs or embryos, but these do not develop into mature individuals within the body, or serve there as the starting point of a new generation. They are passed out with the excrement, and afterwards, at an unascertained stage of development, they may find their way into the stomach of another lamb. From this it will be obvious that the parasites might be present in a flock for years without causing any deaths, and without setting up any symptoms of illness. Such might be the case if the flock had a wide range of pasture, as that would reduce the chances of the parasites voided by affected animals finding their way in large numbers into the alimentary canal of animals then or at a later period put to graze on the same land. But in proportion as the number of sheep kept on a given area are increased the chances of the re-entrance of the parasites with food or water would be multiplied, and a point might thus be reached at which the majority of the flock would come to harbor worms in such numbers as would produce the characteristic disease. It will be gathered from what has been stated that overstocking plays a most important part in causing the disease. Fields on which a large number of lambs affected with the disease have been grazed are certain to be highly contaminated, and lambs put to graze on such fields the following season run great risk of infection. A striking illustration of this danger was afforded by a case in which only the ram lambs on a particular farm suffered. On inquiry it was found that the disease had been prevalent in the preceding autumn, and that the ram lambs had been grazed apart from the ewe lambs on a field in which the diseased lambs had been kept during the first outbreak.

It has already been stated that the power of multiplication within the body is limited, as the eggs or young worms produced there are voided with the excrement. It is equally important to know that no reproduction at all takes place external to the body. The eggs or liberated embryo become dispersed in the soil or find their way into water and although they no doubt undergo a certain stage of development, they do not attain adult size or sexual maturity until they are taken into the stomach. Their powers of existence must be sufficient to enable them to withstand considerable vicissitudes of weather; but it is highly probable that they have a comparatively limited duration of life outside the body. It appears unlikely that these sexually immature parasites can maintain their existence for years in soil or water, and hence even badly contaminated soil would probably again be safe if sheep were kept off it for two or three years. (One can only speculate regarding the efficacy of such agents as lime or salt when applied to the land with the object of killing the worms, but if the parasites are anything like so resistant in their earlier stages of development as they are when full grown, it is difficult to believe that any chemical not absolutely destructive to the herbage could be relied on to kill the worms in the soil.)

*Parasitic Gastro-enteritis in Cattle.*—As already stated, an acute form of disease made its appearance among a previously healthy herd of cattle on a Yorkshire farm in 1879. Its introduction was imputed to a bull purchased in 1877 from a herd in which no cases of the disease hereinafter described were known to have occurred before or since the year 1877. For a year and a half after purchase this bull appeared to be in perfect health, but in 1879 (which was a very wet year) he gradually developed symptoms of disease, and in spite of treatment died in the autumn. During his illness the bull was running in the pastures with the cows. From that time the farm has never been free from the disease. The principal symptoms of the disease were diarrhoea and gradual loss of condition. There was no cough, and the appetite was but little interfered with. As a rule, the animals continued to eat well up to the very last. The majority of the beasts attacked were young animals, but when an older cow was attacked the course of the disease always appeared to be more rapid than in the younger animals. Between 1880 and 1895 there did not appear to be any appreciable relationship between the number of deaths and the wetness of the season. In January, 1896, two animals in the last stage of the disease were sent to the Royal Veterinary College in order that they might be submitted to *post-mortem* examination. After a few days' observation they were slaughtered, and in each case all the organs were found to be healthy save the fourth stomach and the intestines. The main seat of disease was the fourth stomach, the lining membrane of which was inflamed. Microscopic examination of the stomach wall and contents brought to light the presence of numerous small round worms of the species that must be held responsible for the long series of deaths of cattle on this farm. This worm, named *Strongylus convolutus*, from its tendency to coil itself up in the mucous membrane, had occasioned losses of cattle in Germany in 1890. The treatment there of affected animals comprised the isolation of all purging, a liberal diet, and bi-weekly doses of turpentine. It is necessary to explain that although the disease is not contagious in the ordinary sense of the word, still it may be communicated to healthy cattle by grazing them on the same pasture with diseased animals, since the dung of the latter must contain large numbers of eggs or embryos. During the whole of the time the disease prevailed on the

English farm its nature remained obscure, and in no single case did the treatment adopted suffice to effect a cure, although sometimes the progress of the disease appeared to be checked for a period of some months. In 1895 it was recommended that the apparently healthy cattle should also be treated with turpentine once a month. That treatment was carried out during the year, but in spite of it no fewer than eighteen animals died in 1896, the turpentine appearing to be powerless to effect a cure when once the disease had made some headway. In addition to the two cows slaughtered for post-mortem examination, four of the apparently hopeless cases were sent to the college for experimental treatment. One of these died, or, more strictly speaking, was killed when at the point of death, from the disease. Another made considerable progress towards improvement, and was killed to ascertain the condition of the stomach after treatment with lysol, and the two others are still under observation. Regarding the results of the experimental treatment, it would be premature to speak at present.

### Watervale, February 7.

Present—Messrs. S. Solly (in chair), H. Beck, W. Smith, E. Leithbridge, E. Treloar, and E. E. Sobels (Hon Sec.).

BRANCH SHOW.—It was decided on account of the dry season, and the consequent poorness of produce, not to hold the annual fruit, flower, and produce show this year.

OPHTHALMIA.—Members reported prevalence of bad eyes amongst the cattle, principally milch cows, of the district. The eyes run badly at first, then a white film appears over the ball of the eye, considerably impairing the sight, and later on inflammation sets in. [Bathe the eyes twice a day with 40zs. of tincture of opium in a quart of water. If possible, keep the animal in the shade, and, if milch cows, keep a damp cloth over the eyes, and moisten it occasionally.—GEN. SEC.]

### Appila-Yarrowie, February 4.

Present—Messrs. J. H. Bottrall (Chairman), J. M. Grant, J. W. F. Hill, J. O'Connell, W. Stacey, P. Lawson, H. Klemm, and two visitors.

WHEAT EXPERIMENTS.—Mr. O'Connell reported as follows on experiments with different varieties of wheat, sown between May 27 and June 8:—Dart's Imperial, yield per acre 18½cwts. hay and 10bush. wheat weighing 61½lbs. to bushel; Australian Wonder, 23cwts. hay, 11½bush. grain, weight 60½lbs.; Early Para, 27cwts. hay, 13bush. grain, weight 64½lbs.; King's Solid Straw, 20½cwts. hay, 9bush. grain, weight 62½lbs.; Medea, 31cwts. hay, 12bush. grain, 65lbs. weight; Baart, 24½cwts. hay, 13½bush. grain, 64½lbs. weight; White Tuscan, 26½cwts. hay, 10bush. grain, 62½lbs. weight; White Naples, 17½cwts. hay, 10½bush. grain, 64lbs. weight; Zealand, 16½cwts. hay, 11½bush. grain, 63½lbs. weight; Allora, 21½cwts. hay, 12½bush. grain, 61½lbs. weight. He considered Early Para the best all-round wheat, and Medea best for hay. Allora broke down badly, and Australian Wonder was hard to thrash and clean, with small dark grain. The returns would have been heavier but for heavy winds and the ravages of sparrows. Mr. Stacey stated that he had got a return of three bags per acre from King's Rust-resistant wheat, while Rattling Jack alongside only gave 7½bush. He strongly recommended the former wheat for hay, but not for milling unless mixed with other wheats. It weighed 64lbs. to the bushel.

MANURING.—Mr. Stacey reported having put in ninety-three acres with the drill, eighty-five acres being manured with bonedust. The manured portion, which was cut for hay, did not give a better return than the unmanured, though it looked as if it would have yielded more grain. He found he could easily drill in twenty-five acres per day, and believed it would pay to drill the seed in without manure. About fifteen miles from his farm, bonedust had given splendid results this season.

**STOCK COMPLAINT.**—The Chairman referred to prevalence of the disease common amongst their stock during past few years. More cattle had died recently from the complaint, and on being examined the gall was found to be very much enlarged and the lungs much inflamed.

### Koolunga, February 3.

Present—Messrs. T. B. Butcher (Chairman), J. Sandow, R. Palmer, J. Butterfield, W. T. Cooper, R. Jackson, J. Jones, W. Ballinger, J. Button, G. Pennyfield (Hon. Sec), and two visitors.

**CONFERENCE OF BRANCHES.**—It was decided to co-operate with Pine Forest Branch in holding a Conference of Northern Y.P. Branches, at Alford, on March 23.

**FIELD TRIAL.**—It was decided to try to arrange for a field trial of seed and manure drills in the district at an early date.

### Naracoorte, February 12.

Present—Messrs. O. Hunt (Chairman), D. McInnes, S. Schinckel, J. Wynes, H. Buck, and R. U. Paris (Hon. Sec.).

**SOUTH-EASTERN CONFERENCE.**—Several members promised to attend Annual Conference of South-Eastern Branches at Bordertown, on March 16, and Mr. Paris promised to prepare a paper on "Payment for Milk by Results."

**DRILLING AND MANURING.**—An interesting discussion took place on paper on this subject, read at previous meeting by Mr. Smith. The Chairman said one advantage of the drill was in the saving of seed and manure. Mr. Chittleborough told him that in the Neuarpar district he invariably got good results from the use of various phosphatic manures. Mr. Buck said that guano which received no rain when put on the crop did not nearly give such good results as when rain fell on it. Mr. Wynes said that the drill, no doubt, saved a considerable amount of seed. He had inspected crop manured with Thomas phosphate, which was no better than the unmanured crop adjoining.

**IMPROVEMENT OF STOCK.**—Mr. McInnes read a paper on this subject, of which the following is the substance:—

Excepting sheep, which are improving every year, our farm stock have very much deteriorated during the past few years. This is very largely due to the use of worthless sires. To improve our stock we must obtain the services of well-bred sires, and mate them with suitable females. It is the purity of the sire that improves the stock, as all outward appearances come from him, and the internal purity from the dam. Never use a cross-bred sire. How often you see breeders when they want a sire look at a few pounds in the price. It is a serious mistake trying to save a shilling and lose pounds, for remember "like begets like." When I say never use a cross-bred sire, do not think I do not believe in cross-bred stock, for I do; but not in sires, for you never saw a cross-bred sire make much of a name for himself. Every breeder cannot become a stud breeder, because you cannot let your stud sire amongst cross-bred dams. If you do, when he goes back to his pure dams, he may taint the stock and undo what took years to do. How often do some people say breeding goes in at the mouth. They are sadly in error. If you have not the breeding you cannot make an animal look anything. You can stuff as much as you like down a scrubber, and it will never look anything. It does not cost any more to feed a well-bred animal than it does a scrubber, and you will have something for your trouble, and be able to compete in any market. Every breeder who buys a pure-bred sire for service for himself is doing himself a good turn and a great deal for his country. New markets are opening up in strange lands; therefore let us try and improve our stock as our forefathers have done.

A short discussion followed. The Chairman said that heavy draught horses were not required for farm work in this district, and members agreed with the



Chairman that the lighter horses were more suitable. Members were of the opinion that so long as the council allowed bulls to run on the commonage there was no use trying to breed good cattle.

**EXHIBITS.**—Mr. Buck tabled good specimen of watermelon, which was duly sampled. The Chairman showed good specimen of skinless barley.

### Onetree Hill, February 4.

Present—Messrs. J. Bowman (Chairman), F. Bowman, G. Bowman, F. Barritt, and J. Clucas (Hon. Sec.).

**FODDER PLANTS.**—Mr. Barritt recommended the cultivation of tree lucern on an acre or two of sandy soil. He had heard several speak favorably of it as a fodder, and it was besides worthy the attention of beekeepers. Mr. G. Bowman said it was doing well in several places in the district. Tamarisk (*Tamarix gallica*) also grew very readily on sandy land, and provided a fair quantity of fodder which stock became fond of. Mr. Barritt said he knew from experience that milch cows fed upon tamarisk shoots did well. Lucern was also recommended for sowing in dry districts. Members wished to know best time to sow seed of tree lucern. [The best time to sow seed is in the warm weather in sheltered position. Seed may be sown now with fair prospect of success.—GEN. SEC.]

**COVERING HAYSTACKS.**—Considerable discussion took place on the covering of haystacks. Mr. Barritt said he had been experimenting with new wheat bags slit open and sewn together in handy sized covers, also with wheat cloth. The former got a good coating of tar, and the latter was well painted with boiled oil and beeswax. He believed each would last for several years, and would consequently prove more economical than thatching with straw, under which tons of hay were often damaged. These covers would also be convenient in cases of emergency, such as covering the stack in course of construction should rain come on. A surface of 160 sq. yds. could be covered at a cost of about £4.

**POULTRY.**—Mr. Barritt advised farmers to utilise their stubble for the poultry. Temporary shelters could easily be provided, and with a good supply of water they will do well. The water supply could be regulated by means of an oilcan filled with water and turned mouth under upon a shallow trough. By inserting a thin wedge to give the can a slight tilt an automatic flow of water could be effected, and would last for several days.

### Gladstone, February 5.

Present—Messrs. J. Tonkin (Chairman), J. H. Rundle, E. Matthiesson, J. Shephard, C. Gallasch, J. King, T. Hortin, W. A. Wornum, B. Griffiths, J. Brayley, J. Gallasch, E. Coe, and J. Milne (Hon. Sec.).

**CROPS.**—The Chairman reported his crops averaged 6bush. per acre, that manured with  $\frac{1}{2}$  cwt. Thomas phosphate per acre being no better than the unmanured. Mr. King averaged 9bush. to 10bush. and 1 ton of hay per acre.

**BALING HAY.**—Mr. Matthiesson called attention to Professor Lowrie's statement, that at the Royal Agricultural Society's trial in England a hay-baling machine baled 33 tons of new hay at a cost for power and labor of 6d. per ton. Members who had seen the baling machine at Booyoolie at work this season were of opinion that it could not be done for less than 10s. per ton, and the price quoted by Professor Lowrie was misleading.

**FARMING.**—Mr. King read a paper on "Farming: Past, Present, and Future," as follows:—

In the past farming has been carried on in a very slovenly way. When the land was new and clean farmers ploughed, scarified, and some only harrowed in their crops, with the result that in a few years the land became very dirty, and only gave very indifferent crops. Farmers found that they would have to alter their way of farming, and for some years they have mostly put in only fallow ground that has been lying out for one or more years, and it pays much better, although they may not have so much under cultivation. It seems a great pity that we should have so much land lying idle for nearly twelve months in bare fallow: but I admit that it is far better than the old way of raking and scraping in all we could, fallow or no fallow. With the help of the seed and manure drill we will be able to still further improve our way of farming, by fallowing only half as much as we intend putting under crop next season: the other half to either plough up stubble or leave alone, and by using from 1cwt. to 2cwt. of artificial manure per acre the result would be as good a crop or better (very dry seasons excepted) than we generally get off late fallow, and then we should have that much more land to run sheep or other stock on, and by feeding down the paddocks we intend putting under crop next year we need not let many seeds of wild oats, &c., be shed on the land, so as to keep same as clean as possible. Our paddocks are far too large at present, as very often on the part of the paddock we are ploughing the sheep will not stay, going away from the teams or to where the feed is sweeter, whereas if the paddocks were only one-third to half the size we could make the sheep stay near the teams and eat off the feed, instead of ploughing it in, as we often do now. By using the drills and manures we will gradually improve our land so that we will be able to keep more stock, as the manure will show for years in the crops and feed. By putting the seed in with the drill we can either horse-hoe it or by only cross-harrowing we can kill a lot of weeds, as on account of the wheat being in the hollows and the weeds on the ridges we do not pull up much wheat, but a good many weeds. Harrowing also improves the ground by keeping it from cracking so much when the dry weather sets in. It checks the weeds more than it does the wheat, and gives the latter a better chance to get ahead. We will have to use the sheaf binders more in the future, and either use the steam thrasher or header more. They will come very much more into use in a few years than they have been in the past, as by cutting our crops so much earlier we do not run nearly as many risks as by leaving it for a stripper. If one only walks over ground that has been cut with a binder and then walks over that which has been stripped you can hardly find any shed grains after the binder, whereas after the stripper there is nearly always from one up to several bushels per acre shed out and wasted. By using the binder we can start from a week to a fortnight earlier than with the stripper, and then we have the straw and chaff, which is estimated to contain 70 per cent. to 80 per cent. nutriment of hay, which would feed a lot of stock; and again, by using the thrasher and binder we can go in for more rotation of crops by growing oats and barley, which certainly is a change after so much wheat, if not a very great change. The binder also cleans the ground very much better than the stripper. One has only to go and look at a piece of ground that has been cut several times for hay, and you will see that which has been cut with the binder is by far the cleanest. The binder will also clear most of the weeds, such as sheep weed, mustard or wild turnip, &c., which, I am sorry to say, has become very plentiful this last few years. Now, I think our horses cost us too much to feed every year. As a rule we use from fifty acres to 100 acres of our crop every year to feed our working stock, which I think is far too much. I think by using, say, from 30 per cent. to 50 per cent. straw chaffed with our hay (oat straw preferred) we could feed our horses much cheaper. This year I used from 40 per cent. to 50 per cent. straw for my own horses (some oaten straw, but mostly wheaten), and they have done more work with less bran, pollard, or crushed stuff than ever before, and looked better at the end of the season, having put in over 800 acres of crop besides doing a lot of fallowing. I do not think I used more than 40 tons to 50 tons of hay and about 30 tons of straw as bad as the season has been, whereas one of my neighbors told me they had used about 100 tons of hay (the farm is about the same size as mine, only they have not so much under crop, but have done more fallowing and done it better than ever before). We may have to use a little more bran and pollard or crushed stuff by using so much straw, but it would be much cheaper all the same. I have thought for a good many years that mules would be much cheaper to keep than horses, especially in our northern and drier districts, as they are so much harder than horses and would stand hard times much better. No doubt the better you feed the mule the more work he would do. The following clipping was taken from a paper:—"At a sale at Trundle, near Keilor, Victoria, the stock farm of the late Mr. Edward Wilson, one of the proprietors of the *Argus*, more than ninety mules were disposed of. The finest Egyptian, Spanish, and French stallion asses had been procured at heavy cost, and mules from 16 hands to 17 hands high had been bred. Mr. Wilson foresaw the demand that has been so slow in arising, but it has remained for others to reap from his

sowings." Now, I think if we could breed mules that height they would do more work than our best farm horses and live much longer; consequently we would not want to breed so many every year as we do with horses, and we would have less young stock to keep. What we want is for someone with money to take mule-breeding up, or else import stallions so that we could breed them ourselves, and I feel sure that in a few years there would be more mules on our farms than horses, as we would find them much cheaper to keep for the amount of work they would do than horses.

### Cherry Gardens, February 8.

Present—Messrs. E. Wright (Chairman), R. Gibbins, J. Choate, G. Brumby, C. Lewis, J. Richards, S. Potter, T. Jacobs, G. Hicks, J. Metcalf, C. Ricks (Hon. Sec.), and one visitor.

EXHIBITS.—The Hon. Sec. tabled samples of Kaffir corn and sorghum grown on dry hill slopes without irrigation, also sample of ensilage of good quality. He also showed currant grapes and plums grown on steep hill sides, the soil being ironstone gravel over stiff clay.

CONFERENCE.—Delegates were appointed to attend Conference of Southern Branches at Strathalbyn on March 31.

### Boothby, February 7.

Present—Messrs. J. T. Way (Chairman), R. M. B. Whyte, T. Sims, A. Turnbull, M. Leonard, J. A. Foulds, and G. T. Way (Hon. Sec.).

CHANGE OF SEED.—Some discussion took place on letter from Lipson Branch, suggesting exchange of seed wheat between the different Branches of the Bureau. Members agreed as to the benefits of an occasional change of seed, but the distance they would have to cart their seed from the nearest port (thirty miles each way) would be in the way of the members doing anything in the matter.

WATER CONSERVATION.—Considerable discussion took place on this subject, the outcome of which was that Mr. Sims promised to prepare a paper on a water scheme for the district.

HON. SEC.—Mr. R. M. B. Whyte was appointed Hon. Sec., *vice* Mr. G. T. Way, who resigned his position.

EXHIBIT.—Mr. Sims tabled peculiar cluster of almonds, a dozen or more fruits growing closely together on a small branch. On the tree from which this was picked there was a number of similar clusters.

### Mundoora, February 4.

Present—Messrs. J. Blake (Chairman), T. Watt, J. Loveridge, W. Atkinson, N. J. Francis, W. Aitchison, W. Longmire, W. J. Shearer, T. Haines, A. McDonald, G. Haines, A. E. Gardiner (Hon. Sec.), J. Harford (Port Broughton Branch), and five visitors.

CONFERENCE.—Delegates were appointed to attend Conference of Northern Yorke's Peninsula Branches, to be held at Alford on March 23.

MANURING.—Mr. Harford gave an instructing address on this subject, explaining various matters connected with the formation of soils, their exhaustion by constant removal of some of their most important constituents, and the consequent necessity for replacing these by means of fertilisers. He tabled samples of superphosphate, Thomas phosphate, bonedust, guano, &c., and pointed out the values of the different manures, their origin, &c. He showed

that by careful analysis it had been proved that 90 per cent. of the constituents of the wheat crop were obtained from the air; consequently a small allowance of fertiliser put into the soil had a marked result. A hearty vote of thanks was accorded to Mr. Harford for his address, which was greatly appreciated by the members.

### Port Lincoln, February 18.

Present—Messrs. S. Valentine (Chairman), G. E. Goode, J. Telfer, W. Laidlaw, W. Hutcherson, and J. Anderson (Hon. Sec.).

**BEE-KEEPING.**—Mr. Goode read the following paper:—

#### *Are Frame Hives Better than Boxes?*

Many people think when they have got a kerosine case and hived a swarm of bees in it, that they have done all that is required of them until the time comes when the box is full and they wish to take the honey out for their own use. The usual method of doing so is, as you all know, to turn the full box upside down, place an empty one on top, and then with two sticks drum on the sides to drive the poor distracted bees into the upper box, there to make a fresh start for themselves on nothing.

But the cruelty of the system does not end here, for, as we all know, the bees have left behind them in the brood combs many hundreds of young bees in an unhatched state, for a good colony is always provided with a sufficient supply of sealed or unsealed brood to keep their numbers up. These the so-called beekeeper ruthlessly destroys, thinking the bees will soon build more comb and start again. So they will, provided in their late rough treatment their queen has had the good fortune to escape drowning in the honey, unavoidably set running in the process of cutting the combs out. But is it fair to the bees to give them the shock of being driven out of their well-filled home, and obliging them to start building fresh combs and rearing fresh brood? Some will say, how is it to be prevented? The object of this paper is to give a few hints as to how it is to be prevented, and to point out a few advantages of the bar frame over the box hive.

In the bar frames each comb is built separately in a wooden frame. The advantage of this is that each comb can be taken out of the hive at any time, either for the purpose of examination or for extracting the honey. If for the latter purpose the bees can be gently brushed back into the hive with a stiff feather or soft brush, and on a fine sunny day, if care is used, the bees do not resent this in the least. Care must be taken not to move the frame too suddenly when lifting it out, or jerk it in any way. It can be removed, and the bees brushed off, the comb uncapped, put in the extractor, the honey drawn out all in about ten minutes, and the empty comb returned to the hive without the loss of a single bee. They will then start filling the empty comb again with honey, and the operation can be repeated again in a few days, as the bees have no loss of time in building fresh comb. The honey is stored in two or three combs on each side of the hive, the brood comb being always in the centre. There is therefore no need when extracting the honey to disturb the brood combs at all.

To ensure straight combs being built foundation comb is used, either in strips called starters or in full sheets. I would recommend the latter as the best. Foundation comb is made of thin sheets of beeswax, stamped exactly the same size as the cells built by the bees themselves. This being fastened securely to the top bar of the frame, compels the bees to build each comb perfectly straight and separate from each other. The bees take very readily to it, and I have seen them fill ten frames in a fortnight, and within a month have a crate of twenty-eight lb. section boxes filled and capped.

It is not advisable to fill all the frames with full sheets of foundation comb stamped with cells of worker size, as the bees could not then raise any drones, which would be against them in the event of their queen dying. But a good plan is to have a corner or two for the bees to build in some of the brood frames, and thus they will build in cells of the drone size. One of the advantages of this kind of hive is that you can prevent your hive being overrun with drones, and another is that in the event of the bees losing their queen you can materially assist them in getting another. You can also at any time ascertain if there is any disease or pest in your hives, and take measures to free them from it, which is almost impossible with the box hive.

Young swarms are very easily put into the hives. Of course you have the hive all ready, with the frames in their places, that is each bar gin. from the other, and the sheets of foundation well fixed in them. Place the hive on the ground close to where the swarm is hanging on the branch of a tree, or wherever it may have settled; get an empty box and shake the bees off into it, just as you would into the box hive; spread a sheet of newspaper or a cloth in front of the new hive, having plenty of room at the

entrance, then shake the bees out of the box on to the cloth or paper; brush a few of the bees into the entrance with a feather, and in a few seconds you will see them all moving quietly in the full width of the entrance. I always try to find the queen and lifting her gently by the wings place her just within the hive, and then there is a rush among the bees to get in after her. Bees can also be transferred from box hives to bar frames at any time of the year, but this is a branch of the business needing a much longer explanation than I can give to-night.

All the ordinary work needed can be done on nice bright days, during a man's dinner hour, or between 11 and 2 o'clock in the day is the best time for working. Anyone that can handle bees quietly will find their work made much easier by using the frame hive, and the study of the habits of bees a very interesting one, when they can, by the use of the frame hives, find out all they wish to know, and handle the bees with ease at any time, which is impossible with the box hive.

But I would warn all who are much afraid of bees or any who would not be likely to give them the attention required not to try them, for a neglected frame hive is very much worse than an ordinary box, and if once the combs get stuck together, or through neglect the top gets fastened down, I pity the one who tries to do anything with it, but a little attention will lead to further knowledge and provide anyone who cares for it with a very pleasant and well as profitable occupation, and the work can be done by children if they have the inclination for it, as no lifting of full boxes is required.

### Calca, February 12.

Present—Messrs. James Bowman (Chairman), W. Wilcott, A. Newbold, J. E. Dinsdale, F. W. Freeman, J. Bowman, D. P. Thomas (Hon. Sec.), and two visitors.

**PLOUGHING SCRUB LAND.**—Considerable discussion took place on the depth to plough scrub land. Mr. Wilcott would plough not more than 3in. deep the first year and 4in. after. The seed did not germinate well on new land unless ploughed shallow, and if they went deeper at any time than 4in. they would, in this district, turn up the marly limestone, which had a bad effect. He found that by ploughing 4in. deep, sowing the seed, and then scarifying it he got better returns than from any other method. Most of the members agreed with Mr. Wilcott; but Mr. Newbold advocated deep ploughing the first year, so as to mix the ashes thoroughly with the soil, and break up the roots, which would otherwise take the moisture from the crop. Members were unanimous in the opinion that April and May were the best months for sowing wheat on scrub land in this district. Considerable difference of opinion existed as to the best wheats, Steinwedel meeting with much opposition on account of its liability to shake out. Rattling Jack and Purple Straw were mostly favored, while White Tuscan was recommended by some.

**SEED EXPERIMENT.**—Several members reported on results of experiments with Bureau seeds, but the dry season was against good results, especially with grasses and vegetables, which generally failed. Dart's Imperial wheat did fairly well, but Budd's Rust-resistant was very inferior.

### Mount Gambier, February 12.

Present—Messrs. J. Umpherston (Chairman), A. J. Wedd, D. Norman, sen., Stock Inspector Williams, T. Edwards, W. Barrows, W. Mitchell, J. C. Ruwoldt, J. Bowd, M. C. Wilson, and E. Lewis (Hon. Sec.).

**CONFERENCE.**—It was decided to ask the Tatiara Branch to postpone the date of the annual conference of South-Eastern Branches until some time in April, as March 16th was too early to suit this district.

**MANURES.**—Several members reported no benefit noticeable from use of Reliance manure, Thomas phosphate, and superphosphate. Mr. Ruwoldt found the portion treated with bonedust stood the heat better than the rest of the

manured and also the unmanured crops; otherwise there was no difference between them. Mr. Barrows had better results from use of new lime than from Thomas or superphosphate. The dry season had had a most unfavorable effect on the manures. Mr. Wedd said he used some guano from Holloway's Cave in a wet season and had most favorable returns, but used in a dry season it had no effect. Mr. Barrows saw no benefit from use of Kangaroo Island guano this past season.

**EXHIBITS.**—Mr. Edwards tabled sample of guano obtained from a deposit containing many tons. It was decided to get this analysed. Mr. Wilson showed larva of moth, supposed to be the codlin moth. Mr. Williams said this was another moth, name unknown. Mr. Wilson also showed specimen of teazel, which Mr. Bowd said he had growing in his garden, and which he found difficult to eradicate.

### Angaston, February 19.

**Present**—Messrs. R. Player (Chairman), A. Friend, A. Sibley, W. Sagg, F. Salter, M. Andrew, P. Radford, J. Vaughan, and E. S. Matthews (Hon. Sec.).

**OFFICERS.**—Messrs. R. Player, F. Salter, and E. S. Matthews were re-elected Chairman, Vice-chairman, and Hon. Sec. respectively for ensuing year.

**PAPER.**—Mr. E. Salter forwarded a paper on "Notes on Agriculture in England," of which the following is the substance:—

While lately on a visit to England I noticed some matters in connection with agriculture and grazing that might be of interest and use to the members of this Bureau.

The soil is good, but not rich, and, as far as I had an opportunity of observing, it is principally a red loam, which is easily worked.

The average yield of wheat throughout England is about 30 bush. What makes the great difference between our yield and theirs is, principally, climate and rainfall. Not only does nature favor England in this way, but the cloudy sky that prevails so much, even in summer, protects all vegetation from injury by heat, and lessens evaporation. The absence of these conditions is out of our power to remedy, but the enjoyment of them would not entirely account for the splendid average wheat crop in England as compared with ours.

A farmer whom I visited told me that he expected a return of 40 bush. to the acre, and that a neighbor adjoining, from equally good soil, would only reap 10 bush. The sole explanation was the difference in manuring and cultivation of the soil.

A member of this Bureau related a similar instance in his own experience in this colony. He stripped 16 bush. to the acre, and a neighbor, whose property was only divided from his by a Government road, reaped no more than 6 bush.

When in Herefordshire, which is a fertile and beautiful county, I had an opportunity of visiting two farms, and spent some time with the lessees.

On one of these properties the area was 250 acres, for which the rental was 30s. per acre. That you may judge what he got for this consideration, I may say that the land was good and nearly all arable. It was divided by hedges into fields of from one to forty acres. The landlord had a few years since built his tenant a two-storied dwelling house at a cost of £1,000, and the stables, byres, barns, pigstyes, &c., I should estimate would cost another £1,500. This rental of £375 is a goodly sum to raise. In reference to return the tenant told me that he calculated on rent, cultivation, manuring, seed, &c., costing him £6 per acre; but he aimed to make a return of £10 per acre; which he could do in favorable seasons, and this would leave him a good profit. If he got no more than a return of £7 10s. per acre he only realized a livelihood. His profits in good years would be £625, which is a very nice addition to a farmer's capital to make in one year.

The course of the seasons does not run evenly in England, and my friend complained that the three past years had been unpropitious. In 1894 there was too much rain; in 1895 and 1896 too little. Last year was a good season.

The Herefordshire farmer whose holdings I inspected combines grazing with agriculture—indeed from what he told me, I should think it was the largest half of his business. He had six well-bred cows which had been carefully selected from his own stock for their milking qualities and carcass. He kept Shropshire Down sheep, and among his little flock of 100 were one-year wethers, fat lambs, and breeding ewes. He sold his prime fat stock at about 9d. per lb. Mutton and beef were the same price, except that an estimate for the value of wool was made when sheep were sold. Inferior meat was only worth about 6d. per pound. Young bullocks are kept till about three years old.

I learnt that the price of good farm horses is from £40 to £60 each. Fat bullocks £30 and upwards; some yearling wethers weighing about 65lbs., and prime, he valued at 42s.

Like all good English farmers this one had a regular rotation of crops. I asked him if there was a "Farmer's Manual" that would be a guide to farmers here. He said, "No," and if there was one it would be of no use, because everyone has to be guided by experience and the nature of the country. If he took a farm ten miles from his present holding he would have to learn from experience how to treat the soil, what crops to grow, and how to rotate them.

The hay harvest had just been gathered. I had noticed it in the fields on our railway journeys all through the country, and wondered what value such brown-colored bush hay (as we should call it) could have. In England wheat and oat crops are never cut for hay, all of it is made from natural and artificial grasses. It rained about every two or three days during the hay harvest, and I wondered how it could be saved. I found that the dampness did not do it serious damage when in the fields, and that when partially dried the hay is stacked, it then heats, and during the process loses all its green color. The farmer watches his stacks to see that they do not get too hot, in which case the crop has to be unstacked; but with experience this can generally be avoided. The heat of the stack is tested by thrusting a long pointed iron rod into the middle of it.

English hay has none of the sweet smell we enjoy, but nevertheless has a nice inviting savor that one could imagine would be very attractive to animals.

I visited another farm of about the same area. It is beautifully situated near Kernes Bridge, on the Wye. The rent paid for this, too, was 30s. per acre, with even better dwelling and farm buildings. Nearly all the figures and prices I have quoted were endorsed by this farmer. From what I learned incidentally good farm land is worth from £20 to £30 per acre in England. Farm laborers are paid at the rate of from 12s. to 15s. per week, and board and lodge themselves. No class of labor seems to be so badly paid as this. The consequence is that the best hands gravitate to the cities where 20s. to 24s. is the remuneration for unskilled workmen.

Agriculture in England has passed through a crisis owing to the great drop of late years in the price of wheat, and the farmer has had to get his labor as cheaply as possible.

I attended a fortnightly sale of stock where three auctioneers sold fat and store cattle, sheep, lambs, and pigs. Prices were, for good lambs, 25s.; Shropshire Down ewes, 44s.; calves, up to £4. One I saw sold for this price was about ten weeks old, but extra good quality. Pigs, about 40lbs. live weight, sold for from 25s. to 30s. Pork is cheaper than mutton. This sale gave me a good opportunity of seeing a large number of farmers. They were a fine hale lot of men, and were dressed in a way that spoke of well-to-do circumstances. In conversation with them they confirmed what I have stated previously, and I also learned that in some places rents for grazing land ranged as low as from 5s. to 15s. per acre. Doubtless these lands were of inferior quality. I had not much opportunity of gaining information about our frozen meat trade with England, but was surprised to find that it had so little effect in bringing down the prices of meat grown there. I was told by the trade that imported meat from the colonies was retailed at about 6d. per lb., and consumers say that the reason it is not more generally used is that it has lost much of the natural flavor by the freezing.

One thing that attracts the notice of the Australian in England's farms is that all the cattle he sees are well bred, and generally a distinct breed. The same with sheep. Lincolns and Leicesters are to be seen such as do their names credit, but the Shropshire Downs are evidently the favorite just now. Farm horses are usually a credit to their owners.

All the members of this Bureau know that keeping the best dairy and grazing stock and constantly culling the inferior animals means gain. It is a lesson, however, not generally learned, or if learned is not acted upon by our farmers. In our leading industries we are now brought into competition with producers in the same lines in other parts of the world, and we must not have any handicaps that can be removed, or we shall be pushed out of the contest and give our share to others who deserve it better.

### Clarendon, February 10.

Present—Messrs. A. Harper (Chairman), J. Wright, W. Spencer, J. Chapman, W. A. Morphett, J. Spencer, J. Piggott, A. L. Morphett (Hon. Sec.), and one visitor.

**JERSEY BULL.**—It was decided that the charge for service of the Government Jersey bull under control of the Branch should be 5s. per head.

**CONFERENCE.**—Several members promised to attend the Conference of Southern Branches to be held on March 31, at Strathalbyn.

**HORSE-BREEDING.**—Mr. W. Giles, of Morphett Vale, read an interesting essay on "The Horse," of which the following are the principal points:—

After paying a well-deserved tribute to the general usefulness of the horse in all civilised countries, he proceeded to observe that man practices, almost unrestrained, active cruelties and many unwitting enormities, upon this faithful animal, which is said to be constantly deteriorating and becoming more and more subject to disease and premature death. It has been averred that horse-breeding will not pay, and this is true unless the breeder tries to produce something better than is generally found in the market. It is a very rare thing to see a really good horse offered in the Adelaide market for sale. Most of them are really dear at any price. It is surprising that the owners of some of our large stations persist in breeding such weeds to eat up the grass which might be used for better stock. Whenever a really good shapely horse is offered he is quickly snapped up at a remunerative price, but usually such animals are bought privately by buyers who are always on the look-out for a good horse.

His thirty years' experience convinced him that it always pays to breed a good animal, and he believed the landowners in the Southern district would find it a profitable industry. As the foal takes after the dam more than the horse in the matter of temperament and stamina, he would recommend mating good, sound, roomy aged mares, with a good dash of blood in them, with a good, clean-legged, active draught horse. He was aware that the reverse was generally favored, but he was convinced that they would get better results from the blood mare. It was a great mistake to change the sire too often. If you get one that mates well with your mares stick to him, and do not change to every new horse introduced into the district.

### Mount Compass, February 15.

**Present**—Messrs. J. Youlton (Chairman), W. Wright, S. Athurs, M. Jacobs, T. Chaplin, R. Peters, W. Gowling, E. Good, F. Slater, H. McKinlay (Hon. Sec.), and two visitors.

**EXHIBIT.**—Mr. Chaplin tabled a splendid sample of Dart's Imperial wheat, the straw and the grain being of good quality.

**CO-OPERATION.**—The adjourned discussion on this subject was brought to a close, and on a vote being taken the majority favored an attempt being made to formulate a scheme of co-operation likely to be adopted in connection with the blockers in this district.

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### Minlaton, February 19.

**Present**—Messrs. W. Correll (Chairman), M. Twartz, John Anderson, J. McKenzie, Joseph Bennett, D. G. Teichelmann, A. McKenzie, J. Fletcher, S. Vanstone, and Joseph Correll (Hon. Sec.).

**IMPACTION IN CATTLE.**—Considerable discussion took place on the cause of cows dying, principally from impaction of the omasum. Most deaths occur in dry seasons when there is no green feed available, but some occur in the spring months. The Chairman said absence of green feed was undoubtedly the first cause, but the immediate cause seemed to be a fever causing paralysis of the digestive organs. He found feeding bonechar occasionally to his cows had a beneficial effect.

**FERTILISERS ACT.**—Members were of opinion that the Fertilisers Act should be amended to bring guano and its superphosphate within its scope.

**EXHIBITS.**—Messrs. Correll Bros. tabled good samples of Doradilla and Wortley Hall grapes grown without irrigation.

**EXPERIMENTS.**—The Hon. Sec. reported as follows on experiments with wheat and manures:—Budd's Rust-resistant wheat worthy of further trial; on ordinary land and cultivation yielded 3½ bush. per acre. Danish Island oats promise well, but appear identical with Cape oats. Both these were manured with phosphate and muriate of potash. The wheat this season is quite free from red rust. Various grasses failed owing to dry weather. Red



and White Kaffir corn are doing remarkably well considering the season. Planter's Friend proves one of the best drought-resisting sorghums Robin's Branching Sorghum is doing as well as can be expected. Muriate of potash, at rate of  $\frac{1}{2}$  cwt. per acre, has been applied with phosphates to wheat, oats, peas, &c., but in his opinion the results would have been better without the potash. Kainit has been used with oats, 100lbs. per acre being sown on one piece of land with 1 cwt. phosphate and 10lbs. nitrate of soda, and on another strip without the nitrate. He could see no benefit from use of kainit, probably owing to the high percentage of chloride of soda contained in it.

### Mylor, February 5.

Present—Messrs. W. H. Hughes (Chairman), S. W. Jackman, E. J. Oinn, W. Nicholls, T. Mundy, R. Mundy, S. Pearce, J. Roebuck, W. T. Elliott, S. Roebuck, W. G. Clough (Hon. Sec.), and three visitors.

MANURES.—Mr. F. E. H. W. Krichauff wrote *re* unfavorable report concerning use of Thomas phosphate appearing in the September issue of the *Journal of Agriculture and Industry*. Mr. J. Roebuck said he had experimented with a number of manures, but stable manure was easily first. He considered Thomas phosphate inferior to the others. Mr. Probert said he had very good results from Thomas phosphate with turnips in stiff soil. Members considered the report referred to by Mr. Krichauff a fair one, and were generally of opinion that it had been proved by the experiments that Thomas phosphate was not so suitable for this district as other phosphatic manures.

HILLS CONFERENCE.—It was decided that the next annual conference of Hills Branches be held at Mylor on October 25th.

EXPERIMENTS.—Various members reported on experiments with Bureau seeds. Laxton Evolution pea, no good; Quantity and Quality peas, very good; Timothy grass, splendid for hay; Southport Brown Globe onion, a failure; Golden Bush marrow, good sample; Fordhook pickling cucumber, not a good specimen; Kentucky Wonder bean, very good.

EXHIBITS.—Mr. Colbey showed New Zealand oats, sown on May 20th on newly grubbed land manured with bonedust. The crop was 5ft. high when cut for hay on November 16th. Two samples of wheat, one cut green and the other left to ripen, were shown. Members were of opinion that the early sample was superior to the other.

### Forster, February 7.

Present—Messrs. A. Johns (Chairman), C. Bolt, W. Bennett, W. Johns, J. Johns, C. Topsfield, J. R. Bolt, F. Johns, J. Sears (Hon. Sec.), and two visitors.

HORSES.—Mr. W. Johns read a short paper on "How to Manage a Team of Horses on the Farm," of which the following is the substance:—

First, plenty of feed should always be provided. In this district this will consist of hay, wheatchaff, bran, pollard, and crushed or boiled wheat. He considered crushed wheat better than boiled. At seeding time horses should get four meals daily, commencing first thing about 5 a.m., and the last at bedtime. They should have at least about an hour's spell at dinner time, and occasional intervals during the day. Too many hours in the collar is the cause of sore shoulders in many cases. Both the collars and the horses' shoulders require frequent cleaning. A whip should not be necessary for a farm team. If the horses will not go fast enough or pull without it, they are not fit for farm work. At this season of the year when they are liable to become sanded, they should have bran and chaff, with plenty of saltpetre. The bran will keep the bowels loose and carry off the sand, while the saltpetre will keep the water passage clean. If horses are worked much now they must be properly stable fed.

A good discussion followed. Mr. C. Bolt considered that the horses should be thoroughly cleaned every night, in order to prevent soreness. Mr. J. Johns said he found that a cup of boiled linseed in feed for four horses very beneficial.

**MANURING SANDY SOIL.**—Considerable discussion took place on the best manures to use on sandy land. Mr. C. Bolt said they would get good results from any manure, provided they got plenty of rain; stable manure should be thoroughly rotted before using. Mr. T. J. Coon considered superphosphate drilled in the best; he found stable manure caused the crops to dry off in hot, dry weather. Mr. A. Johns found stable manure gave very profitable returns in wet seasons. Mr. Sears agreed.

### Balaklava, February 12

Present—Messrs. C. L. Reuter (Chairman), W. H. Sires, G. Reid, C. H. Reid, A. Manley, and E. M. Sage (Hon. Sec.).

**WHEAT.**—Mr. C. H. Reid said he had suffered considerably from flood waters. Although the land was not washed he obtained very poor crops from land liable to be flooded. It appeared to him that the excessive moisture leached out the soluble constituents of the soil. Mr. Sires advocated early fallowing in preference to late, as there was then not so much danger of takeall, and it allowed any seeds in the soil to germinate that season. Consequently the land was in better condition for the crop. Mr. G. Reid said in early days September and October were the months for fallowing. Why should there be any necessity to fallow earlier now? Mr. Sires thought possibly shortness of feed at seeding time was the cause of the delay. Stock were not in condition to go on with fallowing after seeding was finished, but with a better supply of feed there was no need to spell them. Mr. Manley advocated change of seed from a cooler district, but other members preferred to get it from a drier district, as that from a cooler one would need to be acclimatised before the best results could be expected.

**CEREAL EXPERIMENTS.**—Mr. C. N. Grenfell, of Mount Templeton Public School, forwarded carefully-tabulated results of various experiments conducted at the school plots. Of the varieties of wheat grown from 1893 to 1897, African Baart has invariably given the best returns. King's Jubilee averages next. For 1894-5-6, Pride of Barossa averaged 25bush., but in 1897 only 7½bush. against 20bush. from African Baart. In the experiments with manures, 2cwt. each being applied on stiff loamy soil, with thin limestone rubble subsoil over red clay, the following returns were obtained:—Superphosphate, 25½bush.; Peruvian guano, 16bush.; bonedust, 9½bush.; Thomas phosphate, 8½bush.; kainit, 6½bush. Two cwts. per acre of each manure was applied, the wheat being Cowan's Purple Straw. In oats, in 1897, Cape returned 30½bush.; White Champion, nearly 22½bush.; Scotch Grey, 21½bush.; Algerian, 19½bush.; New Zealand, 8½bush.; Tartarian, 5½bush. Some interesting trials were made with wheats sown before and after rain, the results varying in an astonishing manner. African Baart, sown before rain, gave over 20bush., after rain, 13bush., while with Neuman's the returns were 12½bush., and 21bush. respectively; Club Head, 14bush. and 3bush. respectively; and Scotch Wonder, 3½bush. and 14bush.

### Richman's Creek, February 7.

Present—Messrs. W. Freebairn (Chairman), W. J. Wright, A. Nicholson. A. Knauerhase, J. A. Knox, E. Roberts, J. J. Gebert, P. J. O'Donohue, J. McColl (Hon. Sec.), and one visitor.

**GRISTING WHEAT.**—Arden Vale Branch wrote *re* asking the Farmers' Co-operative Union to erect an Alpha grinding mill in the district on co-operative principles, or to purchase flour and horsefeed in bulk for the farmers. Mr. Gebert read a short paper on the gristing difficulty. He stated that he delivered

wheat for grist to a milling firm, and on weighing the produce found he was 13lbs. flour short in four bags, and 25lbs. pollard in four bags. A few days after he delivered ten bags of wheat at the same mill, carefully weighing them at home, but the miller made the weight 9lbs. less, so that on a transaction of eighteen bags his loss amounted to 4s. 1½d. On speaking to the miller about the light weight in flour and pollard, he stated it was full weight when bagged, but may have lost weight since. Why should the farmer be the loser on both sides? Then the miller deducts 3lbs. from weight for the bag; why should not the same be allowed for when delivering the flour, bran, and pollard? He thought they were too much in the hands of the millers, and that the best way out of the difficulty would be for the farmers to combine. Mr. Wright thought it would be well worth their while to consider whether they could not profitably combine to obtain an Alpha mill, with which Mr. O'Donohue agreed, as besides making their own flour they could crush grain for horsefeed. The Chairman thought they would find these mills too slow in grinding to be of much use, but promised to make inquiries, and, if possible, inspect them at work while in the city. The Hon. Sec. was of the opinion that by the present system of roller milling the flour was too much refined at the expense of nutriment, and that it was not so whole some as that done under the old stone system. He thought the question raised by Mr. Gebert was one that required looking into. The miller required full weight in the wheat even in the driest weather, but compelled the farmer to take the flour, bran, and pollard at the original weight, although it may have shrunk considerably, as shown by Mr. Gebert's statement. Then in the grist the weight should be net and not gross, as is the custom at present. As to combining to purchase flour and horsefeed in bulk, it was well worth consideration if the local mills would not sell at a reasonable rate; they could get quotations from mills down country.

**RAINFALL.**—The following records were tabled:—Mr. W. Freebairn—November, 0·130in.; December, 0·020in. Messrs A. & J. McColl—November, 0·170in.; December, 0·090in. Total for twelve months to December 31st, 1897.—Mr. W. Freebairn—6·590in.; Messrs. A. & J. McColl—8·785in.

### Clare, January 14.

Present—Messrs G. Lloyd (Chairman), W. S. Birks, R. Graham, H. Miller, J. Radford, J. Treleven, and W. Kimber (Hon. Sec.).

**PIED FLY BUG.**—Mr. Miller tabled specimens of fruits showing the severe damage done by this insect, which was known in Victoria as the Rutherglen fly. Peaches were perfectly devoid of moisture as though evaporated; nectarines, apples, tomatoes and other fruits also suffered severely. He had collected a kerosine tin full of these insects from about a square yard of soil. Other members mentioned the damage caused to wheat crops; in some cases they were so thick as to almost blind the driver of the reaper. They were actually killing the Scotch thistle.

**ECONOMIC ENTOMOLOGIST.**—Members were of opinion that the fruit and vine-growing industries were of sufficient importance to justify the appointment by the Government of a competent economic entomologist, and it was therefore decided to support the resolution of the Hills Conference on this matter.

**DRYING RAISINS.**—In reply to question, members recommended 1lb. concentrated lye to 15galls. of water for dipping raisins. Sultanias required to be lightly sulphured if good color was desired.

**EXHIBITS.**—Mr. Radford tabled specimens of White Globe onions, Dart's Imperial wheat, and Danish Island oats. The latter was greatly admired, members being of opinion that it was well worth an extended trial.

**Clare, February 11.**

Present—Messrs. J. Treleaven (in chair), W. Kelly, W. Brks, R. E. H. Hope, and W. Kimber (Hon. Sec.).

**BINDER AND STRIPPER.**—Mr. Hope tabled samples of Purple Straw and White Tuscan wheat, some being harvested with binder and header and others with stripper, and in view of the discussions on the advantages and disadvantages of the different methods of harvesting, asked the members to select the stripped from the headed. From the various selections made it was plain that there was very little difference between them; if anything, however, it was agreed the headed grain was superior. Mr. Hope said he harvested about 100 acres with header, the returns averaging nearly 24 bush. per acre.

**EXHIBITS.**—Samples of green and dried currants were tabled; the former by Mr. Kimber, who stated that the dry season seemed to favor the currants on the flats, as those picked at Chatswood were the finest they had ever harvested. The yield would be nearly 2 tons of dried fruit per acre. He also tabled Cox's Orange Pippin apple, which was highly appreciated. Ribston Pippin, which Mr. Treleaven spoke of as being generally considered to be the best dessert apple in England, did not appear to come to perfection here. Messrs. Kelly and Hope said they grew this variety at Hill River and Wolta Wolta respectively, and found them of good quality. Mr. Hope said he found it an excellent keeper, finishing the last of the crop on New Year's Day.

**MANURING.**—Mr. Radford asked several questions on manures, which were answered as follows:—The members all favor the use of commercial fertilisers; Mr. Hope would not sow another acre with wheat without manure. Manuring in rotation with different classes of fertilisers would keep the land in good heart. Mr. Hope thought in moist districts bonedust would be beneficial, and he would expect beneficial results from its use here. Professor Lowrie told him that the farmer could not go far wrong in using superphosphate. Members considered that by cropping once in three years, as at present, manuring would not cause the soil to become impoverished owing to production of heavier crops.

**Pine Forest, February 8.**

Present—Messrs. W. H. Jettner (Chairman), D. F. Kennedy, J. St. J. Mudge, W. Burgess, G. Zilm, and R. Barr, jun. (Hon. Sec.).

**CONFERENCE.**—Matters in connection with forthcoming Conference of Northern Yorke's Peninsula Branches on March 23 were dealt with. The Hon. Secretary reported that Professor Lowrie and the General Secretary had promised to attend.

**CATTLE COMPLAINTS.**—Mr. Mudge had a cow suffering from "rickets." He had given her a little bonemeal, but found it came expensive for feeding purposes, and asked whether there was any other product rich in phosphates which could be supplied at less cost, such as refuse from sugar-refining establishments. He found that the addition of  $\frac{1}{2}$  lb. of treacle to the ordinary feed effected considerable improvement in the condition of his cows. Mr. Burgess said he had also used bonemeal to advantage with cows suffering from this complaint. The Hon. Secretary thought they should utilise the green and dried bones on the farm. A small mill, suitable for crushing bones, wheat, maize, &c., was advertised by a Sydney firm at 25s. He intended making inquiries as to whether these or similar mills were obtainable in Adelaide.

**DISEASE OF TURKEYS.**—The Chairman reported disease of young turkeys called "scabbed head," and asked for treatment. [Apply carbolic oil, made by thoroughly mixing one part of Calvert's No. 1 acid in fifteen parts olive oil. Give green food, and chopped onions and garlic.—GEN. SEC.].

**CANARY SEED.**—Mr. Burgess reported result of experiment in raising canary seed. He sowed 5lbs. seed on three-quarters of an acre, and reaped a wheat-sack full of grain. He considered the crop a good one for the season. He was very much disappointed with the price offered for the seed locally, viz., 11s. per cwt. A good deal of waste was caused by stripping, and a better method of harvesting would need to be adopted if the plant would pay to cultivate. [Owing to this crop shedding very freely when ripe it should be cut and bound before quite ripe, then carefully stooked. When quite dry it can be thrashed in the ordinary way. It must be handled carefully at every stage or much loss of grain will result. As canary seed is retailed at 2d. per pound, a higher price than 11s. per cwt. wholesale can hardly be expected.—GEN. SEC.].

### Arthurton, February 10.

Present—Messrs. W. Short (Chairman), T. B. Wicks, J. Koch, C. Koch, W. Smith, J. B. Rowe (Hon. Sec.), and one visitor.

**VISIT TO HOMESTEAD.**—This meeting was held at the residence of Mr. T. B. Wicks, and after lunch the visitors inspected the orchard and garden. Usually there is a good supply of fruit and vegetables at this season of the year, but the effects of the drought were plainly noticeable.

**BUNT.**—The Hon. Secretary said he noticed a member of one of the Branches had stated that his experience was that with the feeder of the seedsower taken out there was little danger of bunt in the crops. Mr. Long stated that at last seeding some of his wheat was rather "smutty," and he pickled it as usual with bluestone. When he had nearly finished seeding it came on to rain, and the seed in the seed box got wet. At harvest time the portion sown with the wet seed was quite one-third bunt, while the rest was quite free. Members thought the use of the seed drill would cause some trouble in this respect unless great care was exercised to disinfect the seedsowers as well as the bags in which the pickled seed is placed.

**RAINFALL.**—Recorded at Winulta for 1897, 12.427in. January and February, 1898, nil.

### Bowhill, February 12.

Present—Messrs. W. G. F. Plummer (Chairman), A. Dohnt, J. G. Whitfield, J. MacGlashan, W. Towill, E. Weyland, and H. H. Plummer (Hon. Sec.).

**CEREAL EXPERIMENTS.**—Mr. W. Towill reported that from 100 grains of Gravestock's Frampton wheat, received two seasons previously, he this year reaped 48lbs. of wheat. It was somewhat like Steinwedel, but appeared very liable to bunt. Mr. Dohnt also reported favorably of this wheat. He found it resisted the heavy winds better than any other variety he had grown. Budd's Rust-resistant was also a good variety. Danish Island oat was a wonderful stooler and a strong grower, and should prove a valuable variety. Mr. MacGlashan said he had better results from Gravestock's Frampton wheat than from any other variety. Dart's Imperial in rich land burnt off. Mr. Whitfield said his Dart's Imperial wheat suffered more from hot winds than any other variety. Mr. Weyland said from 300 grains of this wheat he reaped 25lbs. of grain.

**BRANCH SHOW.**—It was decided to communicate with Swan Reach and Forster Branches with a view to holding a combined show of produce about the end of August.

**CURING MEAT.**—The Chairman stated that some time since he killed a beast in sultry weather, and cured part in brine and dry-salted part. He gave every attention to the brine, occasionally boiling it, and kept it at its proper strength. Although the meat was constantly turned it soon went bad, while that dry-salted and placed in bags was still in good order. Mr. Towill had also had better results from dry-salting than from pickling. Mr. Dohnt had pickled a lot of meat at different times, and had very little go bad. Everything depended upon the brine. It should be thick enough to float an egg; then place the meat in it. If the brine is getting thick after a few days boil it up, and skim off all impurities, and keep doing this until it remains free from blood. &c. Mr. Weyland always pickled, and had no losses. It was essential that the meat be kept in a cool place.

**HORSE COMPLAINTS.**—Mr. Towill gave an address on "The Homœopathic Treatment of Horses," in which he referred to the successful treatment of the following complaints:—Colic was really caused by indigestion, and could be cured by giving twelve drops nux vomica (vet.), and ten or twelve minutes later giving eight drops of the same. This would give relief in the severest cases within half an hour. When horses have eaten too much wheat give at once a large bucketful of water, then plenty of exercise until they sweat freely. Good doses of aconite should be given until relief is obtained. Sand and water troubles can be got rid of by use of nux vomica. Mr. Whitfield said having failed to relieve a horse suffering from sand with berg oil, he gave it a dose of aconite, then half an hour later a dose of nux vomica, and repeated the treatment, which proved successful. He had cured a bad case of sunstroke by giving aconite and allowing the animal to have only a bucket of water.

### Davenport, February 11.

Present—Messrs. W. J. Trembath (Chairman), W. G. Pryor, J. E. Lecky, J. Holdsworth, W. Hodshon, J. Roberts, and E. C. T. Roberts (Hon. Sec.).

**WINTER IRRIGATION.**—Mr. Pryor directed attention to article in February issue of the *Journal of Agriculture and Industry* on the benefit of winter irrigation of fruit trees. His own trees and vines, which were well irrigated in winter, bore heavily and the fruit was well developed, while those irrigated only during the summer bore scanty crops of small fruit.

**EXHIBITS.**—Mr. Holdsworth tabled a sample of Fordhook pickling cucumber. The plants bore freely and the fruit was of excellent quality. He also showed sample of Chaina grain, a native of the Himalayas, where it was grown for the grain. It grew to height of 3ft. to 4ft., stooled out well, and required little water.

**FODDER PLANTS.**—An interesting discussion took place on the relative merits of lucern, sorghum, and Johnson grass, the general opinion being that lucern was most profitable in this district. The Chairman had his lucern affected with dodder, and although he treated it with sulphate of iron, he could not kill the parasite. Mr. Pryor recommended digging up the affected plants as the surest remedy. [Cut them closely down and apply solution of sulphate of iron to the soil liberally.—GEN. SEC.]

**ANTS.**—Mr. Pryor mentioned that in his garden a series of combats had been fought between the large black and small red ants. He found that covering the ant holes with heaps of dry sand cleared the ants out in a few days. Mr. Holdsworth said that in his garden the ants had cleared the brown scale from his orange trees. [Paris green placed around the holes will kill all the ants.—GEN. SEC.]

### Forest Range, February 10.

Present—Messrs. G. Monks (Chairman), A. Green, J. Vicars, J. Green, H. Caldicott, H. Waters, J. Fry, J. Sharpe, C. Stafford, S. Collins, W. Cherryman, H. Waters, R. M. Hackett (Hon. Sec.), George Quinn (Inspector of Fruit), and ten visitors.

**INSECT FRIENDS.**—Mr. G. Quinn gave an interesting address on this subject, of which the following is a full abstract:—

The systematic study of predaceous insects with a view to applying the knowledge to practical purposes is, as far as records teach, of a comparatively recent date. In hop-growing countries, particularly in Kent, in England, we are told that the owners of hop gardens bought from collectors and children all the ladybirds they could obtain, and liberated them in their plantations for the purpose of suppressing the hop aphid, or louse, as it is commonly called. This, of course, only had a local bearing, and was simply a matter of transferring useful insects from one part of a county, where they appeared in vast numbers, to another part, where they were scarce. But it is to the enterprise of the Americans chiefly that we owe the practical application of this work in a wider sphere, for they have tried to maintain a natural balance, or rather to regain it after it has been broken in the manner common to ordinary settlement, such as by cultivation and the importation of foreign plants and animals to the exclusion or extermination of others indigenous to the country. The introduction of citrus and other plants to California from Sydney led—as the unrestricted importation of plants always will—to the introduction of insects preying upon these particular plants, and among these the destructive cottony cushion scale (*Icerya purchasi*) was introduced. Its spread was rapid, and the damage great. All mechanical appliances and remedies proved of no avail in coping with it. By correspondence with various gentlemen in Australia, and most notably among these the late Frazer S. Crawford, the Americans learnt that, though indigenous to Australasia, this pest did practically no harm; consequently they conceived the idea of searching for a probable natural check. Mr. Crawford had noted a small parasitic fly (*Leptophonus icerye*) attacking the scales, but it was left to the skilful eye of Mr. A. Koebele, the agent sent from America, to discover in our colony the now famous ladybird beetle (*Vedalia cardinalis*) feeding upon the scales. The transportation of these insects to California was accomplished, and their successful acclimatisation realised. The results of this enterprise are known all over the world, though it is only ten years since Mr. Koebele left California on his first mission. The success of the *Vedalia* led to a second excursion, during which Mr. Koebele collected and forwarded to America many thousands of ladybirds, consisting of some forty different sorts. They were, he said, certain to keep down scale insects of pretty well every injurious sort found in California, but according to latest information they have fallen far short of expectations and the results of the *Vedalia* stand alone as a triumph of applied economic entomology. It is indeed a triumph, but the results and surroundings are but imperfectly understood by the majority of persons interested, and the result is that an erroneous impression has been created in their minds respecting the identical ladybird and the scale insect attacked by it with such destructive energy. In fact it is no uncommon thing to hear some of our orchardists clamoring for the introduction of the “ladybird that cleared the scale in California” for the purpose of devouring the red scale of the citrus tribe. The success of the *Vedalia* in California is no doubt greatly due to the following conditions:—They were taken to a suitable climate, similar to their own; care was exercised to exclude the importation of secondary parasites that destroy the ladybirds here, and what seems of greatest importance “there is no record of this insect feeding on any other than cottony cushion scale”; this last condition points to the real reason why the *Vedalia* carries its attacks to a war of extermination. Mr. Koebele, in his report to the Department of Agriculture, at Washington, said Australia was wonderfully rich in Coccids (scale insects), but possessed predaceous insects sufficient in number to effectually hold them in check. This does not tally with our experiences with some of them. At any rate the red scale has increased of late years in your citrus plantations beyond the capacity of its enemies to overtake. The larvæ of a minute ladybird which Mr. Blackburn, our specialist, has kindly identified as *Rhizobius debilis*, may be found in great numbers feeding upon this scale, but if closely observed it will be found that they chiefly attack the old scales after they have been breeding for some time, and this peculiar habit insures a continuance of the scales. Mr. Koebele says that the natural enemies found on the red scale also feed freely on other scales, this would result in the ladybirds betaking themselves from the red scales when reduced in number to other scales, such as the less harmful black scales, when they were abundant. This has the redeeming feature that artificial checks such as spraying, fumigating, &c., will not destroy these useful insects to any serious extent, because they will always be found upon unsprayed trees outside the gardens, from which they will emigrate to the orchards as their food again becomes plentiful there. Thus far I have only considered the enemies of scale insects, but we have many useful

enemies to assist us in coping with various aphides, such as the woolly blight of the apple, the black aphides on oranges or peaches, and aphides on various garden vegetables. For the suppression of the woolly blight on the apple and the olive green aphides on citrus trees the large spotted ladybird known as *Leis*, or *Coccinella conformis*, is very useful indeed, while it is closely followed in usefulness and numbers by the handsomely marked and smaller *Coccinella repanda*. This little insect works wonders for the vegetable grower, and often without any acknowledgment whatever. I have collected them in various stages by handfuls from beneath aphid-infested pumpkin plants that were pulled up to be burnt. The pear-shaped larvæ of various syrphid flies can be found devouring the aphides on different trees while a small hymenopterous internal parasite works wonders late in the season upon the orange and peach aphides. It is a common saying that the once-dreaded cabbage blight "had died out," but a very superficial observer can see that the dying out is only a condition of repression that is maintained by an internal parasitic fly somewhat similar to that of the peach aphid. As one who attempts to observe the actions of these natural checks with an eye to assisting them in their (to us) useful work, I am driven to the conclusion, from the present evidence, that we cannot safely relegate all of the work of the suppression of insects injurious to our fruit trees and vegetables to the beneficial insects, as nature has no doubt designed that they shall not exhaust their food supplies. The study of this subject seems to reveal the fact that in every instance the pest insects breed and commit great ravages before the suppressing insects increase sufficiently to make their presence felt. In the matter of fighting injurious insects with their own insect enemies the question of surroundings has to be considered, and it is very rarely indeed that the conditions which exist in a well-attended and cultivated orchard district are favorable to the friendly insects, and the question of environment must always be a stumbling-block as the area under cultivation enlarges. To put the matter more plainly, the thorough cultivation and exclusion of cover, other than that afforded by the crop under consideration, has such a disturbing effect on the majority of insects that they quit such a spot, and yet no intelligent grower will think he can produce for any length of time good crops of fruit or vegetables without the best cultivation. As instances of the damage that may be done by a pest before it is mastered by the useful insect the author cited how crops of cabbages are rendered useless by the cabbage aphides before the wasp parasite obtains the upper hand, and how peach trees have the present year's crop of fruit and first foliage completely ruined by the black asphides before either the ladybird or wasp parasites become numerous. In either of these instances a little intelligent labor, applied in the form of a few sprayings of tobacco wash or resin compound, would hold these pests in check, and as the season progressed the natural enemies would take up the work. This has been proved in scores of instances, and further it has been proved that most of the larvæ of the wasp parasite, which are within the bodies of the sprayed asphides, are not killed, as most people imagine, but emerge in due time as fully-developed insects to continue the useful work.

In referring to matters of local interest Mr. Quinn said that he had been unable to detect any insect feeding upon the larvæ of the codlin moth, or any unusual mortality among the caterpillars that might be caused by any other disease, and he attributed the stationary condition of the pest in some orchards in the locality more to the intelligent care shown by the owners than any other cause. He had seen ants in apples, and more particularly in pears, which were or had been infested by the larvæ of the codlin moth, but he had not seen these ants attacking the larvæ when in the fruits, and considered they were drawn there by the sugary excretions which oozed from the injured fruits.

In the discussion which followed Mr. Vickers said he had found codlin grubs in apples on a Quarrenden tree near his house, and he had at once scraped, bandaged, and sprayed with arsenate of soda in limewater, and since that had found no more fruits infested. He had been told that someone had seen wagtails picking the grubs out of the apples. Mr. Monks said he was sorry that Mr. Quinn had not given them more encouragement in the direction of insect friends. He agreed that often the friendly insects arrived on the scene rather late, and he failed in such instances to see that much benefit accrued. He wished to know if it were possible to cultivate the useful insects so as to have large numbers on hand when required. He thought by united action all of these pests could be kept down, and he thought this was an opportunity for the Bureau Branches to work together for the general good. Mr. Collins wished to know whether certain ants, which were found in great numbers at many places, would not destroy the codlin larvæ about the trees. Mr. H. Robson asked if Mr. Quinn would advise spraying for peach aphides when ladybirds were found on the trees. Mr. Vickers wanted to know why the



codlin moth increased more rapidly at Norton's Summit than at Forest Range, and instanced a small well-cultivated garden there in which the pest had increased by thousands this season. Mr. A. Green asked if the same number of broods of codlin moth existed at Forest Range as on the plains. Mr. F. Hackett asked how often the bandages should be examined? Mr. Quinn in reply said that the idea of breeding ladybirds under artificial conditions was feasible, but hardly practicable, because if they were turned loose among aphides before atmospheric conditions were suitable—before the season were sufficiently advanced—they would certainly not breed rapidly. In respect to the ants he wished to point out that ants chiefly bred in undisturbed land, and such did not exist in well-cultivated orchards; and sometimes, as in instances quoted by Mr. Koebele, the clustering of ants after the honeydew upon scale-infested trees often prevented parasites from attacking the scales. In respect to environment, he wished to point out that as the country became more cleared of timber and natural shrubberies the orchardists would find the question of insect pests a more difficult one to grapple with, as all sorts of natural checks, such as insects, reptiles, and birds, would be driven away. He considered that all bandages should be examined once a week, and about a fortnight after the fruits are all gathered the bandages should be examined for stray larvæ. If ladybirds were present on badly-infested peach trees, in small numbers only, he would be inclined to scare the ladybirds away temporarily and use artificial remedies for the aphides until they were reduced in numbers. He considered that the drier open country around Norton's Summit and the presence of old neglected trees in uncultivated ground was no doubt a fruitful cause of the rapid increase of codlin moth there. He considered that more broods of codlin moth hatched in one season on the plains than at a wet cold place like Forest Range. In conclusion he said that no doubt, by studying their habits, predaceous insects would render great help, but could not be relied upon as a solution of the insect pest difficulty.

## SCARCITY OF DOMESTIC SERVANTS IN GREAT BRITAIN.

The London *Daily Chronicle* recently published an article dealing with the question of scarcity of domestic servants in terms which apply with considerable force in Australasia. Especially at holiday time is the difficulty felt, and there are many more public holidays in the colonies than in the old country. Numerous instances could be cited where, on the morning of a public holiday, our dairy-men have been left with thirty to forty cows to milk and feed, and not a single servant to help, because the servants "want a spell," and can readily secure another engagement after the holiday is over. In hotels, restaurants, lodging-houses, clubs, as well as in private families, the desertion by servants on the eve of public holidays is a constant source of worry to the proprietors and managers. Some, even of the colored servants, once so much relied upon by astute employers, are acquiring the bad habit of throwing up their employment at such times, leaving their masters and mistresses stranded at a time when their services are most required.

The *Chronicle* gives several illustrations of the difficulties attendant upon this practice, and says that householders are resorting to the Boys' Home for substitutes in place of the usual female servants. Troops of ladies are frequenting all the institutions where orphan or destitute children are received, and it begins to look as if England's future "Tommy Atkins" would serve his apprenticeship in the kitchen. In America, it is stated, that some "up-to-date" ladies employ a valet to attend upon them in place of a lady's maid, and one of

these asserts that she was never so well taken care of in her life—clothes beautifully, &c. &c. &c. as at the new and never before had her hair so well dressed. In truth, it is invaluable to forget nothing. Her husband has his own val and man does nothing but attend upon myself. The manager of the "Carter Bays House" near Clapham-common, stated that he had great trouble in supplying the demands for lads to fill places in the kitchen, &c. "Ladies come and take my boys as fast as I can supply them" was his statement to a gentleman who was in urgent need of a lad to fill the place of a "general" till a female servant could be found. In many families the boys are kept on in preference to accepting the services of female servants, owing, of course, to their propensity to leave service upon little or no provocation. There is a tendency amongst some heads of families to give up house-keeping on this account, and to adopt the Continental and American system of living in boarding-houses, clubs, and hotels, where they will escape the annoyances caused by servants constantly changing their employers. The question of co-operative housekeeping may yet become an accomplished fact, but it will cause a great struggle in the minds of all those who appreciate the privacy and privileges attaching to domestic life.



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### NOTES AND COMMENTS.

The weather during the month has been warm and dry, with cool nights. The rain during the last week in February started the grass in many places, and further rain is needed to keep it growing and to start the weeds before seeding operations commence. Fruit and vegetables still remain scarce and dear.

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It has been noted by farmers at Minlaton, Yorke's Peninsula, at Kanmantoo, and several other places that cows and other farm animals will leave grass paddocks and linger upon stubble lands where phosphatic manures have been used. In places where live stock are subject to coast disease the owners dress lucern fields with sulphate of iron, and by feeding stock upon the lucern they are restored to good health. In nearly every part of the colony where settlement has cleared off the indigenous grasses and herbs we find that live stock suffer from absence in the substituted pasturage of the minerals and salts which are necessary to the maintenance of perfect health in herbivorous animals.

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It is amusing to learn every now and again that some learned professor is credited with having made a "discovery" of something which has long been known to scientific men; but it is rather annoying to note that the newspaper press is so ready to credit "discoveries" to scientific men who have really only stated an already well-known fact. Lately Professor Slingerland made some remarks upon the habits of the codlin moth, in which he mentioned the already well-known fact that the codlin moth deposits its eggs generally upon the side and not always in the eye or calyx of the apple, and then proceeded to describe the egg, the caterpillar, and the general life-history of the codlin moth most correctly, as might be expected from any well-informed authority. But one of the Canadian papers regarded the whole of his descriptions, &c., as new "discoveries," printed them in type with sensational headings, and now the horticultural columns of the newspaper press throughout the world are announcing Professor Slingerland's great "discoveries."

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It is necessary to insist upon the law and regulations being obeyed when anyone makes a purchase of manufactured or "artificial" fertilisers. The law insists that every person selling such fertilisers *shall* give to the purchaser a

written or printed statement of the percentages of phosphoric acid, potash, nitrogen, &c. The chemical committee of the Royal Agricultural Society of England has exposed a fraud, where the tenants in a large estate in the Midlands had been purchasing a material falsely called "basic slag" (another name for Thomas phosphate), which contained not a trace of phosphoric acid, and only a slight trace of lime. Ninety-seven and a half per cent. of this consisted of oxide of iron and silicious matter. The true Thomas phosphate, or basic slag, is very rich in phosphoric acid, but farmers must make sure that they are not purchasing common iron slag.

Very satisfactory reports continue to come to hand from Queensland concerning the effectiveness of the chicken cholera experiments for the destruction of rabbits. Instructor Cheeseman of the Queensland department laid about 5lbs. weight of pellets, made of oatmeal which had been mixed with water infected with the cholera germs from dead rabbits, on some unoccupied, rabbit-infested country. He has now been advised by a reliable gentleman that a few days afterwards it was impossible to approach the warrens owing to the stench arising from the dead rabbits.

In California the new State law declares that all orchards, nurseries, trees, fruit, packages, &c., infested with scale insects, codlin moth, or other insects injurious to fruit trees and plants, are a public nuisance, and that all infested fruit must be cleaned on the premises where grown, and not in the packing houses.

There are many localities where it will pay well to sow seeds of grasses and other forage plants. Even the bare patches on sheep runs in the arid north could be compelled to produce larger supplies of saltbush, &c., were the hard bare patches broken up to allow the wind-borne seeds to find a lodgment, or even to be sown with seeds of the indigenous vegetation; but in the hilly and cooler parts of the colony a great variety of grasses and other forage plants could be grown with a little trouble and some cost. *Poa pratensis*, most of the fescues, Italian perennial, and other rye grasses, and a number of trefoils and clovers will give splendid results. The land should be well prepared during this month, and sown as early as possible next month, so that advantage may be derived from the early rains.

Very few farmers in this colony grow carrots and parsnips as food for their live stock, and yet it would be profitable to do so where the climate and soil conditions are favorable. The soil should be deep, loamy, friable, and fairly rich, but not newly manured. If well prepared by plough, scarifier, roller, and harrows, it would be level and finely pulverised. The carrots chiefly grown for live stock are Red Altringham, White Belgian, Red Surrey, and James's Intermediate (the best). Eight to ten pounds seed per acre in double rows 27in. to 30in. apart, plants to be thinned to 4in. in the rows, is generally practised. The seeds should be well rubbed with sand to remove the burrs and mixed with 2bush. of sand per acre for sowing. For parsnips, the Jersey Hollow Crown is best; 6lbs. to 8lbs. seed per acre, treated the same as carrot seed. Carrots yield 10 tons to 20 tons per acre; parsnips, 8 tons to 14 tons. A bushel of roots of either is 40lbs.

Red sorrel is a serious pest wherever it gets a footing, because it takes possession of the land to the exclusion of all other plants, and it is extremely difficult to exterminate the intruder. The most effective method at present known is to plough the sorrel under to a depth of at least 5 in., sow dense-growing crops on the land for three years following, then plough the remaining sorrel under before it has a chance to produce seed.

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Branch Conferences of the Agricultural Bureau should include the attendance of every member of each Branch in the district, if possible. The papers to be read should be few in number, short in length, and practical in character. The discussions should be vigorous, each member should say something—provided he *can* do so—and, if possible, that something should be fresh and to the point. Exhibits of products of the farm, dairy, orchard, garden, home industries and manufactures, and utilised waste substances ought to form a prominent feature at these gatherings, and each exhibitor should, if possible, give some particulars concerning the exhibits. All persons interested in rural industries should be invited to attend the Conferences.

## FORESTRY.

### THE INFLUENCE OF LOCAL CONDITIONS ON THE GROWTH OF TREES.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

The influence exercised by local conditions is one of the most important factors in the proper development of trees of all kinds for whatever purpose they may be planted; but it is to local conditions as connected with the growth of trees for the production of timber, that it is now intended more especially to refer. Were it possible to secure invariable uniformity in the conditions more immediately surrounding trees this subject might not be productive of so much that is interesting to the general observer, or demand so much careful consideration from the intending planter, but as it is seldom that the circumstances attending the establishment of large areas of plantations are free from variation, to a greater or less extent, it will be well to glance at this question for a short time; and, in order to gather many of the important ideas that it has to offer when examined, it will be found advantageous to refer to actual results occurring in the growth of certain trees under circumstances which can be readily observed by those desirous of so doing. Everything tends to show that all trees have an undoubted preference for certain definite conditions as to soil, moisture, heat, elevation, and shelter. When they have all the conditions they like best around them they develop to the best advantage; but any change in the conditions they delight in will always be productive of varying results indicating a departure more or less marked from the original type. A good illustration of this may be found in the gum known in common phraseology as the bastard box, but otherwise called botanically *Eucalyptus goniocalyx*. This tree is generally met with in the Flinders Ranges as far north as the hills to the west of Wilmington, and to the south as far as the country now forming part of the Beetaloo catchment area, and even as far as a short distance from the old Beetaloo Station. When it occurs on the summit of the dividing range, growing among the rocks and stones, with little

or no soil worthy of the name it always presents a crooked, scrubby appearance with gnarled and twisted limbs in all shapes and forms, and for all practical purposes is worthless where it is, as its position is generally too inaccessible to any vehicles to make it worth while to cart it for firewood. It may be seen in this useless form on such well-known spots as Mount Remarkable, near McIrose, and on the Bluff, in the Wirrabara Forest, and on other prominent ridges in the same locality. When, however, it occurs several hundred feet lower down in a sheltered valley, or gully, where the rocky ridges are overlaid by a nice alluvial soil caused by the denudation of the higher levels, the same tree presents a far more noble form, and rises to a considerable height, with a trunk developed to such an extent as to give logs large enough in some cases to yield from 1,000 to 1,500 super feet of excellent timber. The young timber likewise develops a far better balanced form, growing into straight well-shaped poles instead of crooked useless scrub. It can be readily seen that in the first instance on the site or position on the summit of the range, exposed to heavy wind, and on loose rocks and stone incapable of retaining the necessary moisture, the tree has a hard battle to fight for existence, and plainly shows the effect of adverse surroundings under the burning atmosphere of the northern climate in its stunted growth. In the second position all the conditions are so altered for the better that a fair chance is allowed the tree to develop in a far more satisfactory form in all respects.

Another case in point occurs in the sugar gum (*Eucalyptus corynocalyx*), which differs to a great degree according to the site it occupies, in general appearance, size, and quality of timber, though botanically the same. The best representation of this species is the tree found in the Flinders Ranges. Though liking a considerable elevation, it does not, as a rule, grow on the highest and most exposed sites, generally flourishing best on the sides of the ranges, a little below their summits, and on a firm, retentive soil, where good drainage is secured by the natural slope of the hill side. Here the trees attain a height of from 100ft. to even 150ft., and the timber produced is of the best kind, heavy, dense, hard, and durable. During the course of seasoning, after felling, the timber loses very little of its weight per cubic foot, and seldom opens to any extent at its ends, even should it be left in the sun for a considerable time. When found on Kangaroo Island, however, this tree presents very different features. There, where growing on the hill sides—its favorite site in the North—it invariably develops only a stunted, useless, form, hardly worth the name of a timber tree, the poor sterile, stony rises being evidently an uncongenial site for it; and the exposure to strong winds from the sea proving a heavy check to its proper growth, it is usually found in its best form in the bottoms of the gullies on the sandy alluvial land occurring there. The difference in the greater shelter thus afforded certainly produces a marked improvement in the tree as compared with the scrubby specimen alluded to from the hill side, but while the trees are in most cases of perhaps a more symmetrical form, with a better proportionate development as timber trees than those of the northern ranges—being narrower in girth and longer in the main trunk than they are—there is a marked difference in the character of the timber, for whereas the northern timber opens so little as to be hardly worth consideration, this timber, when seasoning, shrinks so rapidly and splits so deeply as to prove very unreliable when sawn up, in many instances, however, free from fault it may seem when examined fresh from the saw. The difference in locality between the hill side of the North with good natural drainage, and the moist sandy bottom of the creeks on the island, not infrequently adjacent to almost permanent water, is quite sufficient to account for this variation in the nature of the timber. Another district in which the sugar gum exhibits a type of tree far below the standard of excellence to which

this species attains when at its best is in the country west of Port Lincoln. It was here, from the Marble Range, situated about thirty miles from the port, that the first specimens by which this species was determined were obtained by the late Baron Sir F. von Mueller, and from which the description originated which appear in Bentham's "*Flora Australiensis*," where it is spoken of as "a tall elegant shrub," in which arrested stage of development it may still be found there. The position is one of great exposure to heavy gales from seaward, Coffin's Bay being but a few miles distant, and although further inland in sheltered spots in the low ranges some fair-sized trees are occasionally met with, they never attain the really noble proportions of the northern trees.

The red gum (*Eucalyptus rostrata*) is another tree that varies with its surroundings, and produces a very unreliable timber for many uses when grown in a swampy soil. It then develops many shakes and gum veins. The defects originating from these are not always apparent when the timber comes fresh from the saw, however keenly and capably the material may be examined, but sooner or later a separation takes place along the concentric circles of the annual growth, where perhaps hardly a flaw indicative of ring shake was visible, and sections of the timber sholl off; other portions get detached also in consequence of the timber opening at gum veins. Moreover, the irregular shrinking and warping of such timber is often a very serious drawback as, after two or three months' seasoning, it will frequently present so curved and twisted an outline as to be practically useless in its original form either for sleepers, planking, beams, or any other sawn material requiring a regular true outline. Of course timber of this character may often be used in other ways such as splitting, &c., without much disadvantage, but needs very careful selection after sawing. The trees grown on creeks and rivers, notably on the Murray, require keen inspection, and for many purposes timber from them would not be accepted; but on the other hand, where the red gum grows on a well-drained soil, particularly in some of the hilly districts of this colony, such, for instance, as Gumeracha, Clarendon, the Meadows, and their respective neighborhoods for a considerable distance around, the timber it yields is rightly regarded as entirely unsurpassed for many uses by any colonial hardwood, and, when specially selected, even jarrah must undoubtedly give place to it. It will be evident from the examples already given that local conditions have very powerful weight in determining the character of the timber which will ultimately be produced by any tree, and there is no doubt whatever that much of the difficulty frequently arising in deciding whether or no a certain timber can justly claim a sterling character for utility for certain works originates from the ignorance of the precise conditions prevailing where the trees producing it have been grown. Were this information available, a great deal of what seems to be very contradictory evidence could be reconciled with but little trouble, and fair solution of the knotty question arrived at. Even with a timber like jarrah (*E. marginata*), which has justly attained such a reputation for excellence, it has happened once and again that it has failed to maintain its standard reputation, and this has been due to the failure on the part of the supplying contractor to recognise the well-proven fact that the jarrah of the hill side is superior to the jarrah of the plain or level country in most cases. It is plainly to the interest of timber exporters to ship timber of best and uniform quality, and that only, and to do that, this vital influence of surrounding conditions is one that must be reckoned with, or even a timber of high repute may unjustly get a bad name through the ignorant neglect that would permit timbers of differing quality to be indiscriminately massed together as up to the proper standard. This subject possesses so many aspects that it will be found necessary to extend these observations as opportunities may offer.

## POULTRY NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY D. F. LAURIE.

**Quarantining Poultry.**

This does not mean an extended residence on Torrens Island, but refers to the strong need of strictly isolating all strange birds. The reasons for so doing are many. For instance, a person in the country desires a change of blood or breed, and purchases either from a city or country breeder what he requires. As a rule few people outside the ranks of experienced poultry fanciers know how to pack a bird for a long journey, and, even when so packed, some careless person may place the coop in the brake van of a train, and surround it with packages to such an extent as to almost exclude fresh air; in consequence the bird becomes overheated, and, on exposure to cold, contracts a chill, which develops into a cold, often ending in roup. Naturally the honest breeder is blamed for forwarding a diseased bird. Again, many breeders keep their stock in such insanitary surroundings that the wonder is that they ever survive long enough to breed. In any case, and no matter from whom purchased, put your birds in pens separated from your own stock, and watch them carefully for at least a fortnight. If quite healthy then they may be mated-up as desired. The purchaser has then used all ordinary caution. If I selected birds for anyone I should decidedly invite them to observe these precautions. *Experientia docet*, I once lost some hundreds of birds through the neglect of a lad. He disobeyed orders during my absence; and I have also seen others make the same fatal mistake. Most Australian writers have had a word to say at some time or other about the disgraceful apathy of some poultry owners.

I know a street half a mile long, in a well-known suburb which reeks from end to end with sick fowls suffering from the attacks of ticks (*Argas reflexus*). One has only to detach a paling from any fence to find hundreds of these disgusting pests; even where the outhouses are of brick or masonry the cracks are full of them. The consequence is that, even using all precautions, it is almost impossible to keep poultry in the neighborhood. Again roup is very prevalent, also diphtheria. I have passed poultry houses at night from which, although 20yds. distant, the stench characteristic of roup was so strong that I was compelled to puff my pipe vigorously. I hope the day is not distant when such gross carelessness will be punishable. No child is immune from that dread scourge diphtheria when in the neighborhood of such birds. Many medical men can support this statement, and yet the true cause of many an outbreak is never suspected. Diphtheria was rife some few weeks ago, and I heard of many losses, but so far I have heard of no cases of true chicken cholera. A gentleman called on me recently, as his birds were ailing; he informed me that he had that morning collected and buried over a dozen bodies of fowls which some miscreant had thrown on a vacant allotment in North Adelaide, next to his house. Nothing is so deadly a menace to poultry as the proximity of a dead fowl. Fowls especially will pick at the carcasses and at the decomposed poisonous flesh, and, as a rule, blood poisoning or cholera is the result. When lecturing I was driven out to advise on a case of great mortality among some birds. I had no particulars, nor was the gentleman who drove me acquainted with the case. On reaching the gate the sight of the bodies of several dead birds was quite sufficient, and I soon saw several cases of genuine cholera. If a fowl is found dead the best course to pursue is to burn it; even if buried at a considerable depth there is the risk of some prowling cat or dog attempting body-snatching.



Some time since, Mr. David Wilson, the Victorian dairy expert, writing on the question of the veterinary inspection of poultry, as well as stock, said—"Why should farmers have to run the risk of having their poultry yards decimated by the purchase of diseased pure stock. The time seems to have arrived when all poultry fanciers will have to submit to have their yards inspected by a veterinary surgeon, and they ought to seek for such inspection, as with the scare that has been raised in the country about 'buying disease,' the breeder who could produce a clean bill of health for his birds would be certain to obtain the largest number of orders." I am afraid this must wait till the millennium; besides, few veterinary surgeons know much of such matters as poultry ailments. As long as breeders insist on a method of feeding and food totally opposed to reason, and continue breeding from diseased stock, so long will the trouble remain with us.

### Hints.

The moulting season is now in full swing, and as at this time of year the weather is apt to be changeable, it is well to see that the half-naked birds are not roosting in draughty houses. Give a good variety of food, and add a little solution of sulphate of iron (copperas) to the drinking water, as suggested in a former issue. See that the birds have a good dust bath; it aids the growth of the new plumage. Gather up all old feathers, and sweep up all the scale, &c., from the roosting-houses and burn them. As soon as the birds are through their moult, select the most forward hens and mate up for breeding. Early hatched chicks are very valuable; the pullets are in full lay at a time when eggs are scarce, and the cockerels will find a ready market. The probability is that early-hatched chicks of good quality will find a ready sale next season at excellent prices—so be prepared.

Lose no time in purchasing any needed fresh blood, and buy it good. Although the past season has been a bad one, still there are plenty of good young birds available. Several prominent breeders have at heavy cost imported direct from England some of the best procurable of the most approved varieties. One can now obtain at a fair rate splendid specimens of Dorkings, Langshans, Minorcas, Wyandottes, Indian Game, and Leghorns. I have inspected many lots, and can vouch for their excellence. Importations are still continuing, and I look for a big move in this neglected but profitable branch of the farm. Every farmer should procure for his womenkind some good poultry at once. Copies of my pamphlet are still procurable, and with that and the monthly notes in this journal, no great difficulties should bar the way to profitable success. Where poultry are kept a plot of mangolds and kail should be planted in well-manured soil, near a water supply, so as to ensure a liberal supply of green food when the grass dries off. Green food is a necessary item if success is expected.

## SALE OF COMMERCIAL FERTILISERS.

The attention of buyers and sellers of commercial fertilisers is specially directed to the following clauses of the Fertilisers Act of 1894:—

Clause 1.—(1) Every person who sells for use as a fertiliser of the soil any article manufactured in the said province, or imported from abroad, shall sign and give to the purchaser an invoice stating the name of the article, and whether it is an artificially-compounded article or not, and what is at least the percentage of the nitrogen, potash, phosphoric acid in soluble form, and insoluble phosphoric acid respectively (if any) contained in the article; and

this invoice shall have effect as a warranty by the seller of the statements contained therein. (2) For the purposes of this section an article shall be deemed to be manufactured if it has been subjected to any artificial process.

Clause 2 provides that if any person fails to give such invoice, or causes or permits any invoice or description of the article sold by him to be false in any material particular, shall be liable, without prejudice to any civil liability, on conviction, to a fine of not more than £20; and, on any subsequent conviction, to a fine of not more than £50.

The regulations under the Fertilisers Act provide that any buyer of a fertiliser may have the same analysed by the Agricultural Chemist, at the School of Mines, for a charge of 3s. for each determination, that is, if the buyer wishes to ascertain how much nitrogen the fertiliser contains he must pay 3s., for potash 3s., for phosphoric acid 3s., or for any two or three he would be charged 6s. or 9s. respectively; and if the analysis does not bear out the statement in the invoice these fees have to be paid by the seller.

## MANURING EXPERIMENTS, 1897.

Owing to the favorable results obtained in 1895 and 1896 from the use of the seed and fertiliser drills nearly 60,000 acres were sown with the aid of these machines in 1897. Unfortunately the excessive heat, hot winds, and absence of moisture in October and November seriously affected both the manured and unmanured crops; but it was again found that the manured crops did not blight off any quicker than the unmanured. Although the rain was very late in coming there was every prospect of a good season up to the middle of September; but the two following months were very hot and dry, there being almost a complete absence of rain and a prevalence of scorching north winds, which resulted in the complete failure of the crops in the more northern districts and a partial failure in other parts except the South and South-East.

As showing the difference between the 1897 and average rainfalls, the following figures are given. They are for the growing period of the crop—April to November inclusive—and the mean average fall is for periods ranging from ten to twenty-one years:—Balaklava, 1897, 7in. to 8½in., average 13½in.; Bordertown, 1897, 7½in., average 17½in.; Butc, 1897, 10in., average 12½in.; Georgetown, 1897, 11½in., average 15in.; Jamestown, 1897, 11in., average 12½; Kanmantoo, 8in. to 11in., average 14in.; Maitland, 8in. to 11in., average 15in. to 17in.; Mundoora, 6½in. to 7½in., average 12½in.; Nantawarra, 8½in. to 9½in., average 12½in. The deficiency in the rainfall was aggravated by the fact that October and November, the most critical period, were almost rainless.

In order to place the experiences of those using commercial fertilisers at the disposal of other cultivators printed forms containing a series of questions were sent to the different Branch Bureaus for distribution amongst those who had used these fertilisers. A number of these forms have already been returned, and the following is the gist of the information contained in them. The figures in parentheses following the names of the fertilisers used indicate the price per ton paid for the same.

### BALAKLAVA.

A. Sixty acres, limestone, stiff red and lousy soils, sown with wheat beginning of June. Concentrated English super (£14) and Thomas phosphate (£4 10s.), 35lbs. and from 60lbs. to 100lbs. per acre respectively being applied. The unmanured crop was very poor; the Thomas phosphate gave an advance of 3bush.; super, 2½bush. The severe season—the rainfall during growing period being under 7in.—and the continued hot winds did great damage. But for this the drilled and manured crops would have given a handsome profit.

B. Forty acres, drilled in with 30lbs. wheat and 1cwt. Thomas phosphate (£4 10s.) per acre. Boarded wheat better by 2bush. per acre than unmanured crop; Purple Straw wheat showed no improvement. The manured crops looked splendid up to end of September, but the absence of rain from then onwards prevented the grain maturing properly.

C. Forty acres, ordinary mallee, broadcasted with  $1\frac{1}{2}$  bush. wheat and 2cwt. colonial super (£5) on May 1. Crop 6bush. per acre better than unmanured. Storms and hot winds in November reduced the crop to the extent of nearly a bag to the acre. "No more broadcasting; the drill for me."

D. Four hundred acres, light-brown soil, fallow, broadcasted with 45lbs. wheat and 1cwt. super (£5 4s. 6d) per acre in April and May. Manured crop, 3bush; unmanured, 4bush. per acre. The excessively dry season caused the failure of the manured crop.

E. Seventy acres ordinary mallee soil broadcasted with 45lbs. wheat and  $1\frac{1}{2}$  cwt. colonial super (£5) about end of April, land fallow. Manured crop much better than unmanured; hot winds affected both alike.

F. One acre clay soil, drilled with 30lbs. to 45lbs. wheat and 1cwt. colonial super (£5) in first week in April, on dry ploughed land. The manured stood much better than the rest of the crop, but all was blighted by hot winds.

G. One hundred and sixty acres, light brashy limestone, drilled with 45lbs. wheat and 1cwt. Thomas phosphate (£4 5s.) during first three weeks in May. Land fallowed, rainfall during growing season, 8 $\frac{1}{2}$ in. Manured land, 6bush.; unmanured stiff clay land, 4bush. Do not consider Thomas phosphate suitable for limestone soil.

#### BUTE.

A. Twenty acres, Bay of Biscay soil and sand, manured with Thomas phosphate (£5) and colonial super (£5) at 85lbs drilled in with 35lbs. wheat on April 15. Land ploughed up dry after previous harvest. Rainfall during growing period 10.350in. The rainfall in October and November was insufficient to mature the crop properly. Manures gave similar results, viz., 15cwt. of hay per acre as against 2cwt. from unmanured. The effect of the manure on sandy soil was most marked.

B. Fifteen and a half acres, clay, limestone, and sand, manured with English super (£6), Thomas phosphate (£4), and guano super (£3 15s.), at rate of 80lbs per acre put in with drill with 30lbs. wheat on May 15, crop rolled, land "raw,"; rainfall during growing period 10in. The English super gave far the best result, the average of the manured crops being about 10bush. as compared with 4bush. from unmanured. Two hundred pounds of lime per acre was applied with the drill on one round and gave nearly as good return as the Thomas phosphate.

C. Forty-one acres of clay and light soil, manured with English super (£6), Thomas phosphate (£4), and super guano (£3 15s.), at rate of 85lbs. per acre,  $\frac{1}{2}$  bush. of wheat being drilled in with manure on May 16 on raw land. Rainfall during growing period 10in. Manured crops averaged 8bush.; unmanured,  $3\frac{1}{2}$  bush.

D. One hundred and fifty acres, Bay of Biscay, light sandy loam, and sandhills manured with colonial super (£5 5s.) at rate of 75lbs. per acre, drilled in with 25lbs. of wheat during April and May. Fifty acres sown dry, 100 acres sown after rain. Rainfall during growing period 10.350in.; absence of rain in October and November seriously affected crops. Land ploughed up dry after harvest, crop rolled. Manured land averaged about 6bush, unmanured 3bush. One and a half acres of poor sand was sown with 25lbs. Steinwedel wheat and 2cwt. of English super and gave a return of 18bush. per acre. On three previous occasions this piece of land had, without manure, failed to return more than seed.

#### CRYSTAL BROOK.

A. One hundred and fifty acres fallow land, drilled in with 56lbs. Adelaide Chemical Works' super (£5 5s.) in May. Rainfall very light; manured crop one-third better than unmanured and drilled, but not equal to neighbor's crop, broadcasted in the usual way. Seed was planted too deep.

B. Twenty acres, sand and rubble land, drilled in with 1cwt. manure and 30lbs. to 45lbs. wheat per acre during first week in May. Sugar Company's and English super and Thomas phosphate used. Land fallow; rainfall very light. Results—Sugar Company's super, 3bush. per acre; unmanured, 5bush.; English super and Thomas phosphate, 5bush.

#### GAWJER.

A. Three hundred acres, principally dark, sticky, heavy soil. Thomas phosphate (£4) and Sugar Company's bone phosphate (£4 5s.) being used, from 1cwt to  $1\frac{1}{2}$  cwt. per acre, being drilled in with 5 lbs. to 60lbs. of seed per acre in May and June, the land being afterwards rolled. The land was nearly all fallowed. Absence of rain seriously affected the result, but in comparison with unmanured strips left through the paddock the increase was nearly one-third. From a paddock on which wheat was drilled with phosphate last year quite one-third

more hay was obtained as compared with land unmanured last year. Bonedust drilled in in 1896 at the rate of 1cwt. per acre gave no apparent result, and the oats sown in 1897 on same land showed no beneficial effect.

B. Sixty acres, Bay of Biscay land, broadcasted with 1cwt. of Sugar Company's 'bone phosphate' (£4 13s.), and sown with White Tuscan wheat at the rate of 70lbs. per acre on May 2. Land was early fallow, the manure being put on three weeks before sowing, then harrowed; when the seed was sown the land was scarified and harrowed, and the crop afterwards rolled. Result—Manured crop, 32cwt. of hay; unmanured, 24cwt. per acre.

C. Four hundred acres, sandy and sandy loam, manured with Adelaide Chemical Works' super (£5) and Thomas phosphate (£4 10s.) at rate of 1cwt. per acre, drilled in with 50lbs. wheat in May. Rainfall too light to give satisfactory result.

D. Thirty acres, sandy soil, fallowed, sown broadcast with 1bush. wheat and 2cwt. of bonedust (£4 10s.) per acre in May. The crop was rolled after it was up, and gave half a ton of hay per acre more than the unmanured portion.

E. Twenty acres, Bay of Biscay land, fallowed, broadcasted in May with 1bush. wheat and 1cwt. manure (bonedust and Thomas phosphate) per acre, crop being rolled after it was up. The hot winds and drought affected the crops, but the manured gave 1½bush. per acre extra. With an average rainfall, judging from the growth during the early part of the season and the amount of straw produced, the manured portion would have yielded double the quantity.

#### GLADSTONE.

A. Three and a half acres, red and sandy soil, broadcasted with wheat and 1cwt. Thomas phosphate in May on fallow ground. No noticeable improvement. The season was very dry, less than 8in. of rain falling from date of sowing to harvesting.

B. Three hundred and fifty acres of mostly heavy clay soil, part fallow and part stubble, manured with bone phosphate (£5 5s.), English superphosphate (£5 10s.), and Thomas phosphate, Leeds and star brands (£4 5s. and £4 10s.). Land sown with wheat and part Algerian oats in April to June, 50lbs. to 2cwt. manure and 45lbs. to 75lbs. seed being put in with the drill; the wheat sown at end June at heavier quantity. All the land was harrowed after the crop was well up, and part was rolled. Rainfall during growing period 11½in. Crops severely damaged by hot winds and drought in October and November, when the total rainfall was only ½in. With the exception of the part manured with bone phosphate, the manured parts showed from 25 per cent. to 40 per cent. improvement over the unmanured crop, which was also drilled in. One ton of special top-dressing manure and one ton of nitrate of soda was also applied on parts of the crop, but no benefit was noticeable in either case.

#### JAMESTOWN.

A. Forty acres, hard-setting soil, with clay bottom, drilled in with 45lbs. wheat and 112lbs. manure, in May. Kangaroo Island guano (£2 2s. 6d.) and superfine super (£5 15s.) were used. Land was stubble, this being the third crop since fallow. Rainfall during growing period, 11in. Manured crop, 1 ton hay per acre; unmanured, 10cwt. The manure caused the crop to mature quicker, consequently it was more advanced than the unmanured when the hot weather set in. The guano gave just as good results as the more expensive manure.

#### KANMANTOO.

A. Eight acres, light sandy soil, manured with Kangaroo Island guano (£2 2s. 6d.) at rate of 8cwt. per acre, broadcasted with wheat during first week in June; crop rolled. Land was flooded for some time in September, turned yellow, and never recovered. Manured crop, about 15cwt. of hay per acre; unmanured, not worth cutting.

B. Two and a quarter acres, red loam, manured with kainit, at rate of 100lbs. per acre, broadcasted with seed; results, *nil*. Manure was applied at the wrong time; hence result.

C. Seven acres, light sandy soil, manured with Kangaroo Island guano (£2 2s. 6d.) at rate of 3cwt. per acre, broadcasted early in June with Algerian oats; crop rolled; dry weather and hot winds affected results. Manured crop gave one ton of hay per acre; unmanured, half ton.

D. Eight acres, clay soil, manured with Kangaroo Island guano (£2 2s. 6d.) at rate of 3cwt. per acre, broadcasted with 1½bush. wheat during first week in June on land not fallowed. Manured crop returned 14bush. per acre; unmanured, 6bush.

E. Two and a half acres, hard setting sand and clay soils, manured with Kangaroo Island guano (£2 2s. 6d.) at rate of 2½cwt. per acre, broadcasted in May with 1½bush. wheat per acre; crop rolled, not fallowed. Manured portion yielded double the average of the unmanured. Guano proved very profitable, and in wet season would give even better results.

F. Thirteen acres, part red clay, with ironstone gravel, part sandy loam, and part limestone rubble, manured with Kangaroo Island guano (£2 2s. 6d.), at rate of 3cwt. per acre, broadcasted with wheat (½bush. per acre); crop rolled. Rainfall during growing period, about 9in. A strip of land half a chain wide left unmanured, and even on the stubble this is plainly noticeable. Manured crop gave about double the crop, except on the limestone rubble, where no

improvement was noticeable. The best return was on the sandy loam, probably owing to its retaining the moisture better, as the crop did best on the clay until the dry weather set in. The hot weather, from the beginning of September onward, stunted the crop, especially on patches rather heavily manured.

G. Thirty-seven acres, loose and sandy soil and 30 acres stiff red clay, manured with guano (£2 2s. 6d.), super-guano (£2 5s.), Thomas phosphate (£6), and stable manure. Twenty-five acres was put in with drill in July, 80lbs. to 100lbs. of manure per acre being used. Twenty-five acres broadcasted in June, with 2cwt. manure and 1bush. wheat per acre. Land ploughed up and sown immediately; crop rolled in September. Rainfall during growth, 8½ in. Up to the end of September the drilled crops, which were put in last, showed promise of a magnificent crop, being quite double the others, but the dry weather in October and November, and the scorching winds in the latter month simply dried it up. The guano did fairly well and also stable manure, going about 30cwt. of hay per acre. This was on cold sandy soil. The portion treated with guano stood the dry weather best. The manured crops generally were much thicker than the unmanured.

#### MAITLAND.

A. Fifty-five acres, light grey soil on lime rubble, manured with superphosphate (£6), 100lbs. per acre and 34lbs. wheat being put in with drill in first week of May. The land was fallow, and the wheat rolled when strong enough to stand it. The manured crop returned 8½ bush. per acre, against 3½ bush. from unmanured land.

B. Five hundred and twenty acres, light sandy soil and some limestone, manured with guano superphosphate (£3 10s.), Kangaroo Island guano (£2 12s. 6d.), Thomas phosphate £4 10s.), and wood ashes; 112lbs. superphosphate guano, or 100lbs. to 150lbs. Kangaroo Island guano, or 90lbs. Thomas phosphate, or 30lbs. Thomas phosphate and 150lbs. wood ashes mixed being sown per acre with 30lbs. to 52lbs. wheat between April 1 and May 20. Two hundred and twenty acres were fallow, the rest ploughed up in January and February. The rainfall was not sufficient to give the crop a good start, and seed was put in too deep: rainfall during growing period about 8in. Crop manured with guano super and with Thomas phosphate and wood ashes yielded 2bush. per acre more than unmanured; Kangaroo Island guano about 2bush. less than unmanured.

C. Twenty acres, manured with guano super (£3 10s.) at rate of 1cwt. per acre, and eighteen acres with Kangaroo Island guano (£2 2s.) at rates of 1cwt., 2cwt., and 3cwt. per acre with 45lbs. of wheat, in the third week of May, the land being rolled and worked very fine before drilling. Half land fallow; rainfall during growth, about 8in. Super-guano gave 6bush. to 7bush., quite double the rest of the crop: the Kangaroo Island guano even at 3cwt. gave no result.

D. Fifty-five acres of second-class soil manured with colonial super (£5), and drilled with 40lbs. wheat in April. Crop harrowed after being up one month, and then rolled. Seed was in a month before the rain came, and was also sown too deep, little more than one-third germinating. The plants stood better than ever before, and yielded 8bush. against only 3bush. per acre from unmanured land.

E. One hundred and sixteen acres, sandy land on coast, manured with guano super (£3 15s.) and superphosphate (£5 15s.), and drilled with 45lbs. wheat and 105lbs. and 80lbs. manure respectively in April, and crop rolled. Land fallow, rainfall about 10in. About half the seed malted, and dry weather caused much black rust. Manured crop, about 6bush.; unmanured, 1bush. per acre.

F. One hundred and twenty acres, white rubbly soil, manured with super-guano (£3 15s.) and superphosphate (£5 15s.), 100lbs. and 80lbs. respectively being drilled in with 50lbs. wheat about middle of May, on fallow. Rainfall very light. Manured crops averaged 6bush.; unmanured, 4bush. On twenty acres wood ashes were drilled in, but on this the return was only 3bush.

#### MEADOWS.

A. Two acres, sandy loam, manured with Colonial Sugar Refinery Co.'s fertiliser and sulphate of ammonia, one acre being treated with each manure. The manure was broadcasted with oats in the beginning of June. There was no appreciable result from the use of the manures. Too much rain in August injured the crop; the very hot dry weather following also had a bad effect.

#### MOUNT GAMBIER.

A. Eight acres of black and red loam, potato land, drilled with 1½ bush. wheat and 1cwt. of manure per acre on July 1, and rolled on September 1, when about 6in. high; Thomas phosphate, Reliance bonedust, and super being used. The manured crops showed very much better than unmanured until the dry weather set in, when they all suffered severely. Manures increased the yield to the extent of 2bush. per acre, there being no perceptible difference between the different manures. Too much seed by far was used.

B. Twelve acres strong sand loam, potato land, drilled the middle of June with 45lbs. wheat and 1cwt. manure, English and colonial super and Thomas phosphate being used.

Thomas phosphate appeared to drive the plants along better at first, but the English super was more lasting in its effect. Colonial super was of very little use. The quantity of seed was too small. The whole of the manured crop gave 3bush. to 4bush. more per acre than the unmanured.

C. Twelve acres, sandy to black soil, potato land, drilled with 1bush. wheat and 2cwt. manure, Thomas phosphate, Reliance bone, and super being used. The manured crop was no better than the rest, the average being a bag to the acre. Twelve acres of grass land drilled with Kangaroo Island guano and wheat gave no better return than similar land broadcasted and not manured. One headland was drilled with wheat and new lime, and this was best of all.

D. Eight acres volcanic soil drilled in with 1bush. wheat and 1cwt. of manure, super, Thomas phosphate, bonedust, and Kangaroo Island guano being used. The plot manured with bonedust stood the hot winds better than the other plots and also the unmanured, but otherwise there was no improvement noticeable from use of manure. The extremely dry spring had a very injurious effect on the crops.

#### MOUNT PLEASANT.

A. One hundred and thirty acres, sandy loam and clay, manured with Thomas phosphate (£6 10s.), guano (£4 10s.), and bonedust (£6 10s.) at rate of 1½cwt. per acre, in May; wheat, oats, and barley (at rate of ¾bush.) and peas (at rate of 2bush) being sown with drill and then rolled. Manured crops fully one-third better than unmanured. Yields—Peas, 16bush.; barley, 27bush.; wheat and oats, 2 tons hay and estimate 15bush. to 20bush. per acre. Drought and wind affected crop, but cool changes and dew kept the crop going.

#### MURRAY BRIDGE.

A. Sixty acres, red loam, red pine sand, and white drift sand, manured with Adelaide Chemical Works' super (£5), English super (£5 7s. 6d.), and Thomas phosphate (£4 10s.); super broadcasted with wheat at rate of 2cwt. per acre, Thomas phosphate drilled in at rate of 190lbs. per acre. Land sown in May and June to wheat, red loam being fallow, the sand being ploughed up part dry and part after rain. The best results were obtained on sandy soil, 16bush. per acre; on poor white sand, manured and sown in June the average was 12bush.; unmanured crop on similar soil, 3bush.; other portions of farm, unmanured, yielded from 4bush. to 5bush. The crops would have been much heavier had there been an average spring rainfall, as the straw was sufficient for a 20bush. crop. The heat caused the grain to shrivel somewhat.

B. Fifteen acres, part red sandy soil mixed with mallee and pine and part limestone soil, manured with English super (£5 7s. 6d.) at rate of 1½cwt. per acre; two and a half acres were put in with drill, rest broadcasted, with wheat in June, ¾bush. per acre being sown. The drilled portion had been out of cultivation for two years, but was not grubbed; crop went 10bush. to the acre. Broadcasted crop was on grubbed land, which had been cropped previous year; yield, 25cwt. hay per acre. Unmanured land alongside gave 10cwt. hay and from 2bush. to 8bush. wheat per acre. One paddock of twenty acres, partly new land and fallow, good red sandy soil, sown in April, and not manured, gave a return of 16bush. per acre.

C. Eighty-five acres, sandy soil, broadcasted with about 40lbs. wheat and 90lbs. colonial super (£5 5s.) and English super (£5 7s. 6d.) in April and May, on land not fallowed. Yield, 3bush. per acre more than unmanured.

#### NANTAWARRA.

A. Seventy-eight acres, strong clay and rubbly limestone, manured with English super-phosphate (£4 11s.) and Thomas phosphate (£4 11s. 2d.), 100lbs per acre being drilled in with wheat in May, 40lbs. of seed per acre being used, and the land being rolled after sowing. Land fallowed, rainfall 9¼in. during growing period, crop double that obtained on unmanured land, giving nearly a ton of hay per acre. Crop affected by dry tilling and absence of rain in September and October.

B. Forty-five acres, rich loam, marl, and red clay, manured with English super (£4 11s.) and Thomas phosphate (£4 11s. 2d.), 8 lbs. to 100lbs. being drilled in with wheat in April and May, 40lbs. to 55lbs. of seed per acre, rolled after sowing, and portion also harrowed. Land fallow, rainfall during growing period 8·635in. On rich loam the two manures gave equal results; unmanured, a bushel per acre less. Marl, intermixed with red clay, yielded as follows:—Super, 11bush.; Thomas phosphate, 6bush.; no manure, 6bush. Harrowing after crop was up did not appear to have any beneficial effect. Thomas phosphate does not appear to do much good where there is much lime in the soil.

C. Eighty acres, No. 1 paddock, red clay patches mixed with sand, very hard-setting land; No. 2, light marl, with limestone rubble; manured with English super (£5 11s.) and Thomas phosphate (£4 11s.) sown in April and May with wheat at rate of 40lbs. per acre, manure being drilled in with seed as follows:—No. 1, super, 90lbs.; Thomas phosphate, 1cwt. per acre. No. 2, super, 80lbs.; Thomas phosphate, 1cwt. All land was fallow, and paddock No. 1 was harrowed about middle of August; No. 2 rolled early in August. Rainfall during

growing season 8½in. Season being very dry in early part of tilling crops did not come up till end of May, in consequence of which some parts were so dirty as to effect the result. Paddock No. 1 resulted as follows:—English super, 13½bush. per acre; Thomas phosphate, 10½bush.; broadcast and unmanured, 5½bush. No. 2, English super, 12½bush.; Thomas phosphate, 6bush.; drilled without manure, 3½bush. Drilling without manure in a dry season is a failure; English superphosphate superior to Thomas phosphate, as it is more quickly available and keeps the wheat ahead of the weeds.

#### PORT BROUGHTON AND MUNDOORA.

A. Twelve acres, sandy loam, sown with drill on April 29, with 30lbs. wheat, and manured with 80lbs. Thomas phosphate (£5 10s) per acre. Land not fallowed; rainfall during growing season, 6½in. The manured crop was quite double the other until the hot weather set in, when it went off very fast. It was full of bunt, while the unmanured was quite free, neither being pickled. The absence of rain prevented proper maturing of the plant.

B. Twenty-five acres, light sandy soil sown with drill during May, 30lbs. wheat and 80lbs. Ohlendorf's super (£5 16s. 6d.) per acre being drilled in. Land not fallow; rainfall about 7in. Hot winds while wheat was in bloom blighted the crop. Manured portion yielded 4½bush. more per acre than the unmanured.

C. Twenty acres, light soil, drilled in with 39lbs. wheat and 90lbs. super (£5 17s. 6d.) per acre early in April. Second crop off same land; rainfall during growing period, 6½in. Dry hot winds spoil what promised to be a splendid crop, but believe the practice will pay with a fair rainfall.

D. Eighteen acres, light sandy soil manured with 1cwt. English super (£6) per acre. Land ploughed early in April, manure and 45lbs. wheat sown broadcast and harrowed in. Rainfall during growing period between 6in. and 7in. Result—portion reaped gave 5bush. per acre more than unmanured; portion cut for hay gave 5cwt. per acre increase.

E. One acre, light sandy soil, broadcasted with 50lbs. wheat and 1cwt. English super (£6) per acre about the middle of May. Land ploughed up first week in April. Manure and seed sown on top and harrowed in. Rainfall about 7in. Manured crop ripened a week earlier and yielded 6bush. per acre more than the unmanured crops.

#### PORT ELLIOT.

A. Twenty acres of red sand and clay soil, manured with 3cwt. Kangaroo Island guano per acre, broadcasted in May, June, and July with wheat, oats, and peas; oats rolled, and wheat rolled and harrowed after sowing; yield about 25 per cent more than unmanured. Want of rain and hot winds reduced the hay crop a little, and the grain quite one-third. Manure cost on farm £2 9s. per ton.

#### PORT LINCOLN.

A. Thirty acres, manured with bonedust (£3 10s.), Reliance super (£6 10s.), Thomas phosphate (£4 10s.), seed and manure broadcasted, 2cwt. manure per acre being used. Bonedust gave best results, doing well; super next, with Thomas phosphate a complete failure. The season has been the driest for many years. On an acre of land dressed with 2cwt. of bonedust a bushel of Cape barley was sown, which returned 50bush. of fine plump grain.

#### PORT PIRIE.

A. Seventy acres, light mallee land, manured with Thomas phosphate, 1 0lbs. per acre being put in with seed drill with 35lbs. to 50lbs. wheat. All crop rolled and part harrowed during growth. Sixty acres fallow land. Rainfall during growth was less than 5in. No benefit derived from manure; in fact it seemed to affect the germinating power of the seed, which lay in the soil for ten weeks before sufficient rain fell to cause it to start.

#### SOUTHERN YORKE'S PENINSULA.

A. Three hundred and eighty acres, limestone soil, manured with super (£5 10s.), Thomas phosphate (£3 17s. 6d.), and guano (£2 2s. 6d.), sown with wheat from April 16 to May 24, on land not fallowed; 40lbs. to 45lbs. seed per acre, and 70lbs. super, 70lbs. Thomas phosphate, and 160lbs. guano respectively being drilled in. Rainfall during growing season less than 6in. Two hundred and sixty acres averaged 7bush. per acre, and 120 acres were cut for hay. The dryness of the land at seeding had a bad effect on the germination of the seed.

B. Fifty acres of sandy limestone manured with Thomas phosphate (£4), and super (£5), and drilled with wheat in beginning of May, on stubble land. Manured crop, 4bush.; part unmanured, 3bush., and part not worth reaping.

C. Three hundred and thirty acres, some sandy, but some hard soil, manured with Thomas phosphate (£4 5s.) and super-guano (£3 10s.) at rate of 90lbs. to 100lbs. per acre. Wheat and oats, 1bush. per acre, put in with drill and manure in April and May; 150 acres fallow, rest stubble land. Manure gave a slightly increased yield, but not enough to pay for extra cost. The manures gave as nearly equal results as possible; consequently the super-guano was the better for the price. The absence of rain in spring prevented a fair crop being grown.

## STRATHALBYN.

A. One hundred and nine acres, sandy, Bay of Biscay and heavy clay soil, manured with Sugar Co.'s super (£6 10s.), wheat, barley, and oats being sown with drill with 1cwt. manure per acre, 1bush. seed of wheat and barley and 1½bush. of oats; sown June 4 to July 11; harrowed after crop was up, and rolled in spring; land so-called worn out and not fallowed; rainfall during growing period 10½in. Hot winds in November worked havoc, lessening yield by 10bush. per acre at least. Results: Twenty-eight and three-quarter acres barley gave 16½bush. per acre and 45 tons of straw; twelve acres wheat, 16½bush. per acre and 12 tons straw; eight acres wheat, 12bush. per acre stripped—this was on light sandy soil which had repeatedly failed to return any profit without manuring; thirty-five acres cut for hay, 25cwt. per acre; eighteen acres oats, 17½bush. stripped per acre—this on land that last year gave 32bush. of barley per acre when manured. Anyone farming on this class of land should get a drill by some means, as it will pay for itself several times over the first year. In spite of the fact that we have had practically no rain since August, the returns show a very handsome profit. No part of the crop was put in without manure, as previous experience has proved conclusively that such practice is most unprofitable. Last year as an experiment a paddock of thirty-two acres was sown with barley, half being manured and half left untreated. The result was 32bush. per acre from the former, and nothing from the latter.

B. Eight acres, light soil, sown with wheat first week in June, manured with Thomas phosphate, super, and Sugar Co.'s phosphate, 100lbs., per acre being drilled in with seed. Crop was better than the unmanured crop, but was not as satisfactory as expected, and the results show that either more or different manures must be used to produce better returns.

C. Forty-two acres, manured with super (£5 10s.) at rate of 1cwt. and 1½cwt. per acre, put in with drill with wheat at rate of 40lbs. to 45lbs. per acre on poor worn-out scrub land. Crop manured with 1cwt. super per acre gave 13bush. per acre, while the same class of land sown broadcast with a bushel of wheat to the acre only averaged 5bush. Some of the land manured at rate of 1½cwt. super had the benefit of a flood and cut over 3 tons hay per acre, while the average of the manured hay crop was over 2 tons. This was on light sandy, to good soil.

## TATIARA.

A. Ninety-three acres, part stiff clay and part loam. Thomas phosphate (£5 5s.), at rate of 12lbs. per bushel, was mixed with seed after pickling, and seed sown immediately afterwards. Wheat, 50lbs. to 60lbs. to acre, and oats 1bush., sown in May and June, land being newly ploughed up. After sowing, well harrowed and clods broken by roller. By comparison with unmanured strips estimate increased yield of wheat at 2bush. per acre; oats not so much, but still markedly better than unmanured. The very dry season affected the result considerably. Phosphate does not appear to have such a good effect on oats as on wheat, but am satisfied that, with both, the increased crop more than repaid the increased expense and labor.

B. Nineteen acres sandy soil, with clay subsoil, sown middle of July with wheat, manured with English superphosphate (£6), Thomas phosphate (£3 16s.), and guano (£3 10s.)—prices for goods on wharf, Port Adelaide—at rate of 1cwt. per acre, put in with drill, ½bush. of seed being used. This proved quite enough to give thick crop. The land was old wheat land, cropped previous year, broken up in July, harrowed and sown at once. Rain during growing period, 7½in. Dry spring and late sowing materially affected prospects. Unmanured crops, sown two months earlier, yielded 6bush. per acre. Manured—Super, 15bush.; Thomas phosphate, 13bush.; guano, 12bush.

C. Four and a half acres, mostly very poor, manured with Sydney bonedust and bone phosphate (£5 10s.), at rate of 2cwt. per acre, with Algerian oats at rate of 1bush. per acre, by means of drill; date of sowing, May 31. Cut 50 per cent. more hay from manured crop. Absence of rain in October seriously affected result.

D. Forty-four acres, mostly sandy soil, manured with Thomas phosphate (£5 2s.), Sugar Co.'s phosphate (£4 18s.), Reliance bonedust (£4 18s.), and English super (£5 18s.), 40lbs. wheat and 35lbs. oats and barley drilled in with manure in middle of June on unfallowed land. Manured wheat, 14½bush.; unmanured, 4½bush.; oats, 20bush.; and barley, 30bush. No oats or barley put in without manure. The severe hot weather when the wheat was in bloom blighted the wheat. If Purple Straw instead of White Tuscan had been sown yield would have been better. So satisfied with result that will always use fertilisers when cropping old land.

## TEATREE GULLY.

A. Eighty acres, black and red loam, manured with Thomas phosphate (£4 10s.), English super (£6), Sydney super (£6), at rate of 1cwt., 80lbs. and 80lbs. per acre respectively; 45lbs. to 60lbs. wheat drilled in with manure in first week in June and rolled after sowing; land fallowed. No improvement noticeable from use of Thomas phosphate, very little from English, and same with Sydney super on red loam with clay subsoil, but on black land it gave an increased yield of 1 ton of hay per acre.



B. One hundred and sixty acres, mostly black and red clay, manured with Thomas phosphate (£4 10s.) and bonedust (£4 5s.) in May and June. Part drilled in and part broadcast, at rate of 1cwt. per acre with wheat and oats. Land fallowed; crop rolled. Manured crops far better than unmanured. Deficient rainfall was against the full benefit being obtained from use of manure. Strongly believe in drilling the seed and manure in together.

#### YANKALLILA.

A. Eight acres of light shallow soil on clay bottom, broadcasted with Kangaroo Island guano (£2 3s.) at rate of 2cwt. per acre, and sown with wheat in June. The land was cropped for hay the previous year; crop rolled. Result distinctly favorable to use of manure.

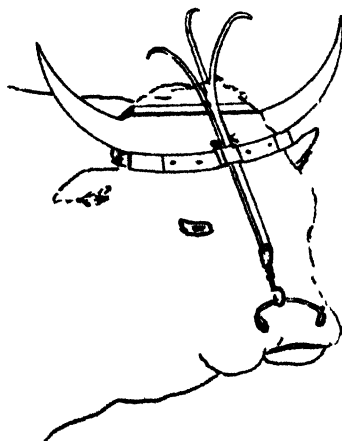
B. Twenty acres of red soil sown with Cape oats and wheat in May, at rate 60lbs. to the acre, superphosphate (£7) at rate of 70lbs. per acre drilled in with seed. Crop rolled and harrowed after it was up. Where the manure was applied the seed kept growing and made quicker growth than the unmanured. At certain periods the manured portion was quite 1ft. higher than the other, but at harvest there was very little difference in the height, though the manured was much thicker and ripened quicker, and gave much better return.

C. Seventy acres, sandy soil, sown with wheat and oats in June, super (£7 10s.) and bonedust (£6 5s.) at rate of 1cwt. per acre being drilled in with seed, 40lbs. wheat and 60lbs. oats being sown. Land was ploughed up after harvest and again before sowing; crop was rolled. The manured crop fully one-third better than unmanured, besides which the saving of seed by use of drill is considerable.

D. Thirty-one acres, sandy soil, drilled in with  $\frac{1}{2}$ cwt. superphosphate (£7) and 40lbs. wheat or 60lbs. oats per acre in May and June. The land was ploughed up just before seeding. The manured crop returned 30 per cent. more than the unmanured.

### SOME HELPS FOR THE FARMER.

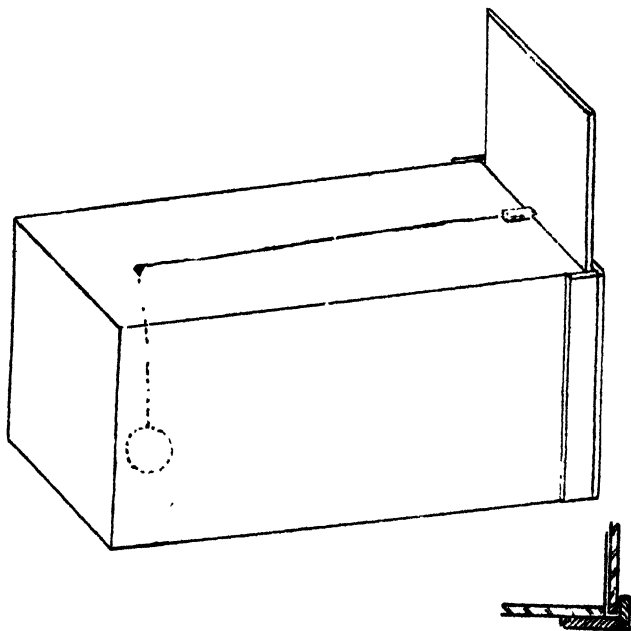
Fence-breaking bulls are a great trouble to all farmers occupying farms in the neighborhood of such animals. To prevent this propensity many devices have been tried, many of these being cruel as well clumsy. Mr. Smith, of Reynella, South Australia, has adapted the contrivance here shown, a sample of which has been made and presented to the Central Agricultural Bureau by Mr. F. Townsend, blacksmith, Mitcham. The cost of similar article is 10s. :—



The total length of the iron rod and hooked branches is 27in. From the bottom end to stop key is 13in., from key to bottom of the three branches is 4in., branches 10in. The rod is  $\frac{3}{4}$ in. square; the branches are of  $\frac{1}{2}$ in. wire; the leather strap round the horns is 4in. long, but is doubled back at the buckled end 15in., making its real length 2ft. 6in. On the front of the doubled part an iron plate 7in. x 1 $\frac{1}{2}$ in. x  $\frac{1}{2}$ in. thick is riveted with four rivets, commencing at 5 $\frac{1}{2}$ in. from the buckle. In the centre of the iron plate is a staple,

through which the rod slides up or down. At the lower end of the rod a spring trace hook is fixed by a 2in. iron wire link, and the trace hook is affixed to the nose ring of the bull. The nose ring is of  $\frac{5}{8}$ in. iron, 3 $\frac{3}{4}$ in. outside diameter. It will be easily seen that the bull, when attempting to put his head beneath a rail or wire, will catch one or other of the hooks on it, and this will cause a sharp, unpleasant tug on the nose ring.

Wild cats, native squirrels, and other quadrupeds often cause a deal of havoc in the poultry-house. They can be easily trapped with an old kerosine box. The drawing below gives a good idea of how to fix the trap.



Sometimes the trap will be more effective if both ends are removed and one end is stopped with fine-mesh wire net or wire bars. If the mesh is large the animals may claw the bait through the bars instead of entering the trap. When any animal has thus been caught it is easy to place the mouth of a bag around the entrance of the trap, then drive the prey into the bag and immerse it in water. The barred or netted end is convenient, as it enables one to see whether the pet pussy has been trapped.

The falling door, it will be seen, is sustained by a small tongue of wood, the end of which is cut slantwise and enters a shallow slot in the door. The other end has a string attached which passes through a hole bored slantwise towards the back of the trap and close to the bottom board. Directly the animal pulls on the bait the tongue of wood slips out and the door falls. The door slides up and down within cleats nailed on the sides and end of the box, as shown in drawing marked A, which represents a section of the right-hand corner at the top of the trap.

**SORRELL.**—At a meeting of the Kettering Branch of the Tasmanian Bureau of Agriculture, Mr. Rastone said he had a field covered with sorrell, and sowed it with cocksfoot and red clover, with the result that the sorrell was killed the first season, and he also cut 2 tons of hay per acre.

## WHEAT FOR SEED.

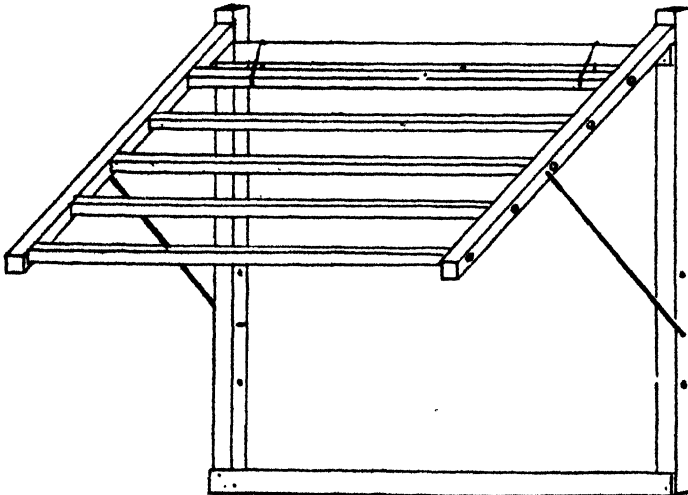
At the Wagga Experimental Farm during the past four years very careful experiments on a large scale have been conducted to test the relative values of large plump seed as opposed to small shrivelled seed, and the results show most conclusively that large plump seed will always give better results than shrivelled seeds.

Experiments have also been carried out to ascertain how seed wheat deteriorates with age, and Dr. Cobb is satisfied that seed wheat kept in a dry, warm place deteriorates in value very little in five years. This is a matter of some importance, as it shows that a good sample may be stored for several years as a standby in case the wheat grown for seed is inferior owing to climatic conditions. By storing seed wheat for two or three years a change of seed is not so soon necessary.

The best way to clean wheat for seed with the winnower is to take out the sieves and whiteheads board, raise the backboard, take off the shacker-bar at the drum, and blow your wheat clean. You must blow sufficiently hard to make the wheat drop at the top end of the screen; all chaff, oats, sheepweed, cracked grain, and small wheat will then drop into headers spout. Care must be taken not to stand the winnower higher at the back than the front, as then you will not be able to blow hard enough to make a first-class sample.—*Communicated.*

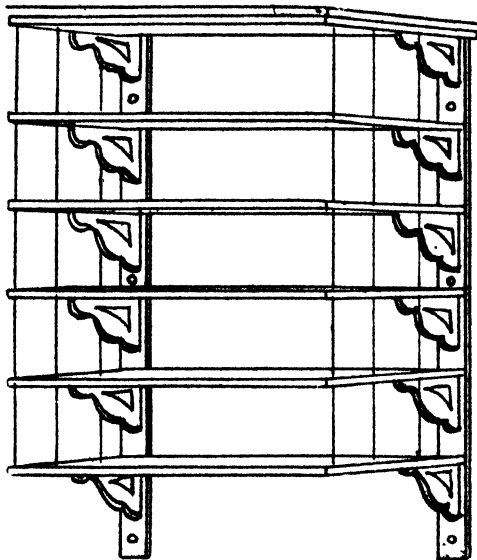
## HOUSEHOLD CONVENIENCES.

A portable hanging clothes rack would be a great convenience in many a farmhouse where room could not be afforded for one which would permanently occupy too much room. The pattern here illustrated may be made of any convenient size, and can be provided with loops of wire or ears of sheet iron at the top corners, by which it can be hung upon hooks or strong nails.



Instead of hinges to connect the rack with the hanging frame it can be affixed by means of two loops of wire, as shown. When not in use the two iron rods can be detached and the rack will fold down. The iron rods can be substituted with wooden struts.

A cheap substantial set of book shelves can be made with very little cost and trouble from one or two packing cases. The brackets supporting the shelves need not be so elaborate as shown in the drawing, but may each be made with two strips an inch thick and 2in. wide, one to serve as a strut and the other to support the end of the shelf.



To prevent the books falling at the ends of the shelves three wires, preferably of copper, should be run through holes made at equal distances apart. If the woodwork is painted with white enamel paint it may be lightened with very pale blue on the edges of the shelves, &c. If necessary the books can be protected from flies by curtains.

## PAYMENT FOR VERMIN DESTRUCTION.

Mr. T. S. Palmer, in the Year Book of the U.S.A. Department of Agriculture for 1896, in an article on the "Extermination of Noxious Animals by Bounties," sums up the result of bounty legislation in the United States for over 250 years, as follows:—

Rewards have been paid on large animals, such as wolves, coyotes, bears, and panthers, small mammals (as gophers, ground squirrels and rabbits), and on a birds, such as crows, English sparrows, hawks, and owls.

During the past twenty-five years this has involved an expenditure of over £600,000, and the expense seems to be increasing instead of decreasing. Single laws have caused an outlay of nearly £40,000 in less than two years.

Bounties have not resulted in the extermination of a single species in the United States, and have failed even in the Island of Bermuda, which has an area of less than twenty square miles.

Extermination of noxious animals is usually slow, and can be accomplished more effectively and economically through the efforts of individual landowners than by the lavish expenditure of public funds.

The objections to the bounty system are grouped under four main heads—(a) expense, which is usually out of all proportion to the benefit gained, and may be greater than the county or State can afford; (b) impossibility of maintaining

bounties in all parts of an animal's range for any length of time; (c) impossibility of maintaining equal rates in all States; (d) impossibility of preventing payment for animals imported from other States, for counterfeit scalps, or for animals raised especially for the bounty. These objections have never been satisfactorily overcome, and most laws have failed through one or other of these causes.

The correctness of most of these objections has been fully borne out by Australian experience, more particularly with the payment for rabbit destruction. It would be both instructive and startling if the actual cost to the public funds during the past twenty-five years for vermin destruction in the Australian colonies could be published.

South Australia alone has paid over £300,000 from the public funds as bounties on wild dogs, rabbits, foxes, and eaglehawks, besides which the Government has distributed, since 1890, in bounties for wild dogs, from funds raised by taxing the landholders outside the district council boundaries, the sum of £27,000. New South Wales paid from the public funds between 1883 and 1890 over £500,000 for rabbit destruction, besides about the same amount levied by taxing the landowners. The Victorian figures would probably be nearly as high; and, bearing in mind that this does not include the money spent by private individuals on vermin destruction and by individuals and Governments for vermin-proof fencing, it will be seen that the total cost of vermin destruction in the three colonies has been something stupendous. The introduction of rabbits into Australia has, without doubt, been the most costly mistake we have made, as the indirect expenses and losses through their ravages far exceed the direct expenditure for rabbit destruction, which, in the three colonies, cannot have fallen short of £3,000,000.

## DAIRYING—SCIENCE AND PRACTICE.

By G. S. THOMSON, N.D.D., ETC., DAIRY INSTRUCTOR.

During the past few years the advance in the practice (and notably in the science) of dairying has been so rapid that, in order to attain a creditable position in the competitive circle, we must adopt, when found profitable, the valuable theories laid down by science, and introduce into our manufacturing system machinery of modern design. In districts of varying character it is advisable to conduct preliminary experiments in order to ascertain if the surrounding conditions and circumstances will permit the introduction of any particular advanced system. In Denmark we have a strong rival in the butter trade, where about 1,000,000 cwt. of butter are exported yearly to England, and the reception given to this Danish butter is quite familiar to all. It is but natural that we would expect to find that where the original discoverers and promoters in the science and practice of dairying are most diligently at work a superior dairy product, commanding a marketable value, high in quality, and high in price. It is not impossible for the Australian colonies to outstrip Denmark in the exportation of butter, with a merit equal if not superior in character, even against the trying conditions of climate, long transmission, and delay on arrival in the English markets prior to the butter reaching the hands of the consumer. The extent of Denmark's trade cannot be much increased, as the acreage of the country is limited, and, in comparison to the available dairying districts of the colonies, is but small. We must realise that, along with the much talked of favorable conditions in Denmark, there must be still a something accountable for her success. It is the advance in education and in the application of the most approved of dairy appliances which has brought Denmark to the position which she proudly holds to-day. It must be remembered

that £110,000 is yearly spent upon educational matters and research work, and the result of such an expenditure must necessarily raise their standard as butter makers in advance of many other countries. To forward the science and practice of dairying has long been an effort of the Danes, with dairy colleges and experimental stations dotted all over the country, where the work of original research, as in the production of superior cream-ripening cultures, is extensively carried on. These cultures are dispatched in suitable quantities to the different factories where a deficiency of flavor or an undesirable change has been found as acting detrimental to the value of the butter. The system of pasteurisation is strongly adopted, followed by artificial ripening of cream, the manufacturer gaining by this process a twofold advantage, in the superior standard of aroma together with an extended keeping quality of the butter. Bacteriology—the most important subject bearing upon successful dairying, and proving, as it has done, the excessive dangers of uncleanly habits, causing a loss of thousands of pounds—receives particular and profitable attention in Denmark. Chemistry, physics, botany, and veterinary science each hold a place in the curriculum of the dairy school, the study of these subjects being sensibly carried to an extent not beyond the limit of dairying. We must not, however, work so exclusively upon purely scientific principles as to become inattentive to the necessity of thorough co-operation with practice, as this would undoubtedly be an unsuccessful adventure, both in the management of dairy farms and of butter factories. With regard to the manufacture of butter and cheese upon an extensive scale the manufacturer has to be guarded against many dangers, as the methods employed in one district if similarly carried on in another, with easily overlooked adverse conditions existing, such a similarity in method would, in all probability, partially act as a poison to the manufactured product. It will be possible that some factory managers will be so far handicapped, having to battle against the trying difficulties of varied and treacherous pasture, the milk from which in many cases is very difficult to deal with. Where factories are fortunate as to situation, easy of access, and at a short distance from their milk producers, in a locality where natural sweet herbage exclusively forms the food of the milk cows nearly all the year round, where modern buildings and machinery constitute the factory, where scientific and practical advice is immediately available, and where sound and thoughtful men stand at the head of the business, no foreign country could be termed a dangerous rival. We are advancing towards superior breeding of dairy cattle—a matter worthy of strict attention. It ought to be the strong desire of the breeder to aim at a breed of cattle having the highest combined attainments, including good milking qualities, healthy constitutions, suitability to climate, fattening property, and docility. In the Shorthorn we have an animal possessing all these points, although such a breed requires liberal feeding in comparison to Ayrshire and many others. In some localities where cheese-making is the aim of the farmer he would probably choose the Ayrshire, the milk of which containing, as it does, fat globules small in size, and where the viscosity of the high percentage of casein retains the fat, preventing its rising and separating during the cheese-making process. In butter-making, again, milk is more valuable with a high percentage of fat, of large globules, and decreased percentage of casein. To increase the value of a herd for dairy purposes it is of the utmost importance to know the pedigree of the dams. Careful breeders keep a register, and select those cows for breeding purposes whose records show the highest at the close of a definite period. The advantages of a register, used when an improvement in breeding is desired, would be as follows:—

1. Knowledge of both quantity and quality of milk is obtained, with special attention to heaviest milkers.

2. Knowledge of falling-off in good animals, and causes investigated, as to health, disturbance, carelessness in milking, &c., &c.
3. Knowledge of the most profitable animals, and accordingly those worthy of selection for breeding purposes.

The variation in the quality and quantity of milk in the colonies in some cases must be considerable, owing to the deficiency of nutritious food during periods of hot and dry weather. The food for a milk cow, we are all aware, must be fairly rich in albuminous matter, as a milking cow yields daily a considerable amount of nitrogenous ingredients in the milk. Natural-grown herbage supplies all the requirements for the formation of a high quality of milk. When the supply of albuminoids becomes less than the demands of the living matter of the body quality of milk must diminish, which is found when cows are fed upon dry, parched herbage. Should the amount of albuminoids be increased, both quantity and quality of milk improve. When the supply of albuminoid matter is equal to the demands of the living matter the addition of more albuminoids does not increase the quality of the milk. This statement can be proved when cows are grazing upon an excessive extent of rich pasture, as the increase in quality will not extend beyond a certain standard. We are told to breed for quality and feed for quantity. Still, attention to the above-stated facts must not be overlooked.

It might be of interest to mention some of the circumstances affecting the quality of milk from the cows :—

1. The inherited property that a cow possesses in making fat, called individuality.
2. Upon the food given, which, as before stated, must be sufficient and fairly rich in albuminoid matter.
3. Treatment of the cow.—A cow's milk fluctuates from day to day; she cannot be constant, perhaps due to disturbance by dogs and people, thereby reducing both quality and quantity of milk.
4. Irregularities of milking, and number of times the cow is milked.
5. Nature of drinking water affects quality.
6. Season of year.—The milk is found poor in the spring, gradually rising in quality towards the middle of summer, decreasing again in the hottest month, and afterwards reaching its highest quality in the autumn.
7. Period of lactation and disease.

In relation to the quality of butter, which depends upon—

- a. Nature of cream with regard to purity from dirt, which bears heavily upon the quality of butter.
- b. Ripeness.—If insufficiently ripe an excess of sugar will be left, causing fermentation; if over-ripened, probable rancidity.
- c. Thickness of cream, which means that the lactic acid has been rejected in separation; difficulty in proper ripening.
- d. Under-washing, leaving an excess of butter-milk in the butter, and particularly the cleanliness of water.
- e. Temperature and speed of churning.
- f. Speed of working and quality and quantity of salt, &c.

These statements, although simple, are liable to be become overlooked by all.

With regard to firmness of butter, a difficulty we have often to contend with independently of climate; softness is often due to an undue cooling of the cream fat. Although the cream, as a body, has assumed a desired temperature for churning, still the time occupied in cooling may be insufficient for the fat, which retains its high temperature much longer than the other solids.

Color in butter is improved by breed of cows, good food, by use of salt, &c., and is decreased by light, overwashing, and overchurning.

As we have heard a great deal of late with regard to the necessity of pasteurising our cream prior to butter-making, it might be beneficial to say a little about this process and its necessity.

Pasteurisation was first adopted by the late great French bacteriologist, Pasteur, the process taking his name. It may be necessary for the benefit of a few to explain the direct necessity of adopting a system of pasteurisation. To begin with, it may be asked what existing substance, what mechanical, what living body brings about the so common souring and varied taints in our dairy produce? Such changes are almost invariably due to the destructive influences of microscopic living bodies, called bacteria, so minute that only by the aid of a powerful microscope can we determine their structure. Milk is the luxuriant home of all forms of germ life, holding in solution abundance of immediately available food for their support; hence their rapid multiplying powers. These ferments are the manufacturers of various acids, the most common (the lactic acid) possessing the chemical property of curdling and souring milk or cream. The expense and trouble of sterilisation, pasteurisation, the adoption of freezing temperatures, and the use of preservatives are all adopted to check and destroy bacteria and thereby lengthen the keeping quality of the produce. Undoubtedly we desire the presence of one or more forms of bacteria, to a certain extent, in the ripening of our cream, giving, when not overdone, a superior quality of butter, together with a higher keeping quality. At the present day, in Australia especially, where the climatic conditions and long transmission of milk and butter favor and intensify the multiplication of germ life when dirt is present, is pasteurisation of so great value. For a prolongation of the keeping quality of butter, which is necessary for exportation, a means of retarding the destructive influence of the acid-forming bacteria prior to the manufacture of the butter must have attention. In order to arrive at this in the most perfect manner, first adopt perfect cleanliness in the milking of cows, with special regard to person and udder of animal, together with utensils, as pails, separator, &c. The surrounding conditions with relation to cleanliness of byres (if any), milkhouses, purity of feeding stuffs when used, and the great importance of pure drinking water to dairy cattle, all greatly extend the keeping quality of dairy produce. This absolutely essential care must be carried out till the milk is passed through the separator, but great care is still necessary after separation. During the process much of the dirt and bacteria adhering substances become removed and retained in the pans of the machine or pass into the separated cream. Secondly, cans for transmission of the cream must be first washed with slightly warm water, and afterwards thoroughly steamed or scalded by boiling water, and thence exposed, if possible, to the influence of strong light and sun; this will ensure almost sterilisation. Upon arrival of the cans of cream at the factory a perfectly clean space ought to be located for their removal if found necessary to be kept even for the shortest time. It undoubtedly very seldom happens that cream requires to be kept, owing to its partial advanced state when received at the factory. We now arrive at the time for pasteurisation, with a product in cream, so far free from bacteria, which entails so much trouble and expense.

By attention to the above-stated points much less efficiency will be demanded by pasteurisation. Milk or cream undergoing pasteurisation is passed into a steam-jacketed and steam-admitted circular vat. In this vat or cylinder is a metal propeller driven by the steam, which prevents the milk or cream adhering to the sides of the cylinder, as it is kept in constant movement. We have by this device a greater uniformity in pasteurisation. The temperature varies according to certain conditions, but should not be over 150° Fah. when possible, as a higher temperature brings about certain chemical changes. After pasteurisation the milk or cream ought to be immediately cooled down to a temperature as found most suitable.



## THE DAIRY.

### **A Dairy Instructor for South Australia.**

The Hon. Minister of Agriculture whilst in Melbourne attending the Federal Conference lost no opportunity of acquiring knowledge of agronomical industries likely to prove beneficial to his own colony. Amongst other matters he learned that there was a gentleman open to engagement who possessed very special qualifications as a teacher of the science and practice of dairying, and he at once arranged for an interview with the gentleman, with the result that Mr. George S. Thomson was engaged for a certain period as dairy expert for the Department of Agriculture of South Australia. Mr. Thomson is a Scotchman, born at Dunkeld, Perthshire, is aged 24, and possesses great qualifications for the work he has undertaken. He studied for two sessions under Professor Drummond, at the Scottish Dairy Institute, at Kilmarnock, and in 1897 gained the National Dairy Diploma, the highest in dairy science that can be obtained in Great Britain, and he also gained the gold medal in the practical dairy competition, held at Kilmarnock, and open to the United Kingdom. Mr. Thomson has also studied veterinary surgery, medicine, and chemistry for a short time, under Professor McCall.

### **Copra Cake.**

The use of oil cake for dairy cows is regarded as an absolute necessity in practically every country where dairying is carried on, unless one excepts Australia, where comparatively speaking, very little is used. Until the drought of the past two years compelled a number of South Australian dairymen to purchase copra cake to make up for the deficiency in their ordinary foods it was a very rare thing to find a dairyman using oil cake of any description. Denmark imports about 100,000 tons of oil cake annually, and in the regulations drawn up under Government supervision suppliers of milk to the dairy factories are bound to include a certain proportion of oil cake in their food rations. Not only does the feeding of oil cake increase the flow of milk to a very marked extent, but it keeps the animals in much better health, and the manure, also, is much richer in fertilising constituents. By the expenditure of less than 1s. per cow per week for oil cake the dairyman will get an increased flow of milk sufficient to amply repay this. Cows that have not been fed before on this class of food must be given very little to start with, say  $\frac{1}{2}$  lb. daily, increasing the quantity gradually up to 2 lbs. If the full quantity is given at once it will have an injurious effect. The oil cake is softened in hot water, when it will increase in bulk to a considerable extent, and mixed with the usual feed of bran or chaff. At present copra cake sells at £6 10s per ton, equal to about  $\frac{3}{4}$ d. per pound. The Editor will be glad to hear from any readers who have used this oil cake for their stock during the past year.

Copra cake is the residuum of dried cocoanut after the major portion of the oil has been pressed out. The oil is largely used in the manufacture of Sun-light soap.

### **The Dairying Industry in Sweden.**

From a report furnished by the British Consul in Sweden, the following information concerning the dairy industry in Sweden is taken.

It is estimated that the value of the milk produced in Sweden at 350 galls. per cow on 1,500,000 head is nearly ten millions of pounds sterling, the milk being valued at  $4\frac{1}{4}$ d. per gallon. Besides small dairies which manufacture butter and cheese for local consumption, there are 1,800 large dairies, more than 1,400 of which make butter only. Of these factories 625 deal with milk produced by the owners, 735 with part or wholly purchased milk, and 340 are

worked as co-operative dairies. Some of the latter have 400 members, and one deals with 4,000galls. daily, others 1,200 to 3,300galls.

In 1896, about 175,000,000galls. of milk were converted into butter and cheese, producing 512,000cwts. of butter and 150,000cwts. mixed cheese. The direct export of butter to England amounted to 324,000cwts., valued at £1,664,000, while about 160,000cwts. were exported through Denmark. The average price obtained in London was £5 8s. 3d. per cwt. In order to watch over the Swedish butter trade in England the Government has a dairy agent established in Manchester.

Dairy instruction is given to experts at a high dairy school, to men at a lower dairy school, and to women at seven dairy schools, while there are also twenty-four dairy stations for women, besides two agricultural colleges at which instruction is given. A Chief Dairy Inspector is maintained by the Government, and in every county a dairy expert is stationed to travel about the district giving advice and instruction. There are twenty-three of these experts, one of whom is a woman, and they are paid by the agricultural societies of the different counties. One thousand four hundred and seventy-two pounds is annually devoted to the inspection and testing, by means of analyses, &c., of butter. The annual Government grant for dairy purposes is about £2,700, while the agricultural societies grant £5,300; portion of the expenses in connection with the two colleges is also debited to the cost of dairy instruction.

In regard to sanitary matters, the authorities are very strict, the duty of enforcing sanitary measures being placed on the communal authorities, while the addition on any ingredient injurious to health is punished with imprisonment for from two to six years.

## PRACTICAL SPRAYING TESTS FOR CODLIN MOTH.

*(From the "American Agriculturist.")*

The good effect of spraying fruit trees is well brought out in a report made by the Ontario Department of Agriculture, covering experiments followed last season. For the third year in succession practical instruction in spraying was given at various places in the province, being continued last year under the direction of W. M. Orr, of Fruitland, a successful grower of wide experience. He selected twenty-nine orchards in various parts of Ontario, providing each with a cheap but practical spraying outfit. Three men with experience in spraying were selected to visit these orchards, performing the operation at certain fixed dates. Notice was sent in advance to all interested, and much good work was thus performed in this educational line. The sprayers repeated the work until seven successive applications had been made. In order to find out what the owners of the orchards thought of the results of the spraying, and to determine as to the possibility of continuing the instruction in 1898, Deputy Minister of Agriculture, C. C. James, sent special inquiries to all orchardists, and their replies point to universal satisfaction in the work.

The testimony of these fruitgrowers includes the following:—E. E. Luton, of St. Thomas—"I consider spraying a most decided success financially; I received \$2 50c. per bushel for my apples, or 15c. above any others in this section, the majority selling at \$1 50c. to \$1 85c., realising twice as much money from the sprayed trees as from the unsprayed." A. C. Sussex, Borthwell—"From the trees sprayed 75 per cent. first class, unsprayed not more than 5 per cent." W. E. Hooper, Lucan—"My crop was far above the average in this locality and fruit the best I ever raised, perfectly free from worms; applied

the solution to small fruit as well as the trees." Norman McPherson, Kincardine—"The Snow apple trees that were sprayed realised \$4 each; those not sprayed, nothing, as the fruit was scarcely worth picking; Northern Spys fully 50 per cent. better through spraying." George Dixon, Port Arthur—"Sprayed trees 70 per cent. good apples, those not sprayed only 10 per cent." W. A. Warner, Trenton—"Apple-pickers say the fruit obtained from my trees which were sprayed was the finest they had packed, especially Spys, Snows, Worthies, and Baldwins. I have 2,500 trees, and intend to spray everything in my orchard next year; am satisfied that if I had sprayed all the past year I would have obtained \$500 more than I did."

## SAN JOSE SCALE.

As the opinion of Professor J. B. Smith, of New Jersey, U.S.A., that fruit-growers need have no great fear, in that State at least, of the San Jose scale, has been published in several Australian journals, we wish to caution growers against any relaxation of their watchfulness. Professor Smith appears to stand almost alone in his opinion, most of the American entomologists being outspoken in their opinions that it will prove, and has proved in many places, the most insidious pest the fruitgrowers have to contend with.

In the *Journal of Agriculture and Industry* for February, page 571, the experience of Dr. Groff, of Pennsylvania, is given, and now, in a late bulletin of the Ohio Experimental State, Professor Webster explains the effects of its ravages in that State, and mentions that, owing to the fact that there are four or five broods each season, one female may be the progenitor of over one and a half millions of scales in the season. Unfortunately it is very microscopic in size, about  $\frac{1}{16}$  in. in diameter; consequently it is not generally noticed until it has obtained a firm footing. Hence the necessity for keeping a constant and careful lookout to prevent its introduction.

Professor Webster says—"It is usually the case that as we become more familiar with a species some vulnerable point will be found, or a certain stage during which it can be managed with greater ease than at other times. It must be confessed that in the case of the San Jose scale the better we come to be acquainted with it the more we see to fear of its ravages and of the great labor involved in its eradication. No one who has not seen the work of this pest can understand its fearfully destructive nature. When we consider that every portion of the surface of the trunk, branches, and twigs, even to their very tips, must be reached and covered with the whale oil soap mixture, and that this must be done continually for several years, and at least twice each year, before a reasonable degree of safety can be expected, it will be seen at a glance that unless the trees are valuable ones, and the injury already done not sufficiently severe to permanently affect the tree, it will be far cheaper to destroy it than to incur the expense of treatment."

This scale affects nearly all varieties of fruit and ornamental trees, shrubs, &c. and is already firmly established in parts of New South Wales and Victoria.

**RAPE** is one of the cruciferae, allied to the cabbage family, and generally requires a deep rich soil—the richer the better—but it often grows well on wheat-sick land. Superphosphate, about 2cwt. per acre, drilled with the seed will give the plants a good start. Three pounds of seed per acre is an abundance; if well drilled half that quantity would suffice. Sow very early to catch the first rains. Turnips should also be sown in the same way and at same time.

## THE VINEYARD.

### NOTES AND HINTS FOR APRIL.

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

*Written for the "Journal of Agriculture and Industry."*

The vintage completed, there is little to be done in the vineyard pending the arrival of the winter rains. Vinegrowers might, however, take advantage of slack time in filling up blanks by means of layers. This is a practice too often neglected, and which cannot be too strongly recommended to those whose vineyards are unfortunately wanting in regularity. In soils that do not lie too wet in winter layering can be started as soon as the wood is ripe; if, however, the vineyard is low-lying, and apt to become more or less water-logged during the winter months, it is as well to postpone the operation until the early spring.

During the past season vines have been somewhat severely tried, and it behoves vinegrowers to encourage their growth and development as much as possible during the coming year. Most of our vineyard areas have been visited by welcome rains during the past month, which will help the plants to ripen their wood to advantage. On no account should early pruning be resorted to this winter, as it will only tend to accentuate the weakness of the vines. Growers should wait until the leaves are completely fallen and the wood perfectly ripe. The first winter ploughing, to which I will refer in my May notes, should be made as thorough as possible, and given as early as other operations permit. By no means remit it to September, as is unfortunately too frequently the practice of South Australian growers. Cows, horses, and stock of all kind should be severely excluded from the vineyard, as beside other damage by browsing the leaves before the wood is perfectly ripe, they only help to increase the general weakness of the plants.

Those who take any interest in their vines will go to the further trouble and expense of dressing them rather heavily with manure. The difference in yield and vegetation will amply repay their pains.

## A NEW DWARF BEAN.

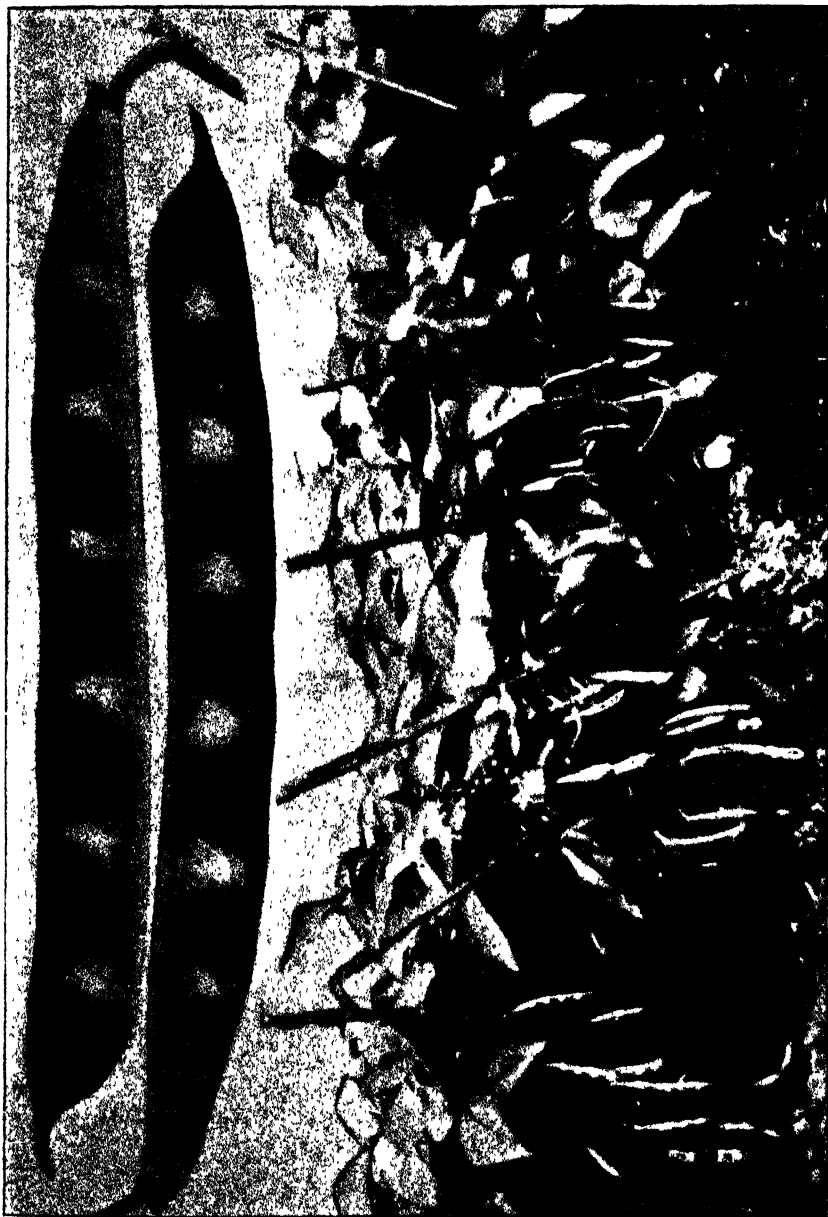
BY GEORGE QUINN.

In 1894, Mr. F. C. Smith, of Angaston, who was then travelling in California, procured from Mr. Jas. Sproule, of the Sunset Seed Company of San Francisco, seeds of a highly-prized dwarf bean called "Best of All." He forwarded a sample of the seeds to the Central Agricultural Bureau, and they arrived here in January, 1894. Small parcels were distributed to several members of the Bureau, including Mr. C. Ricks, hon. secretary of the Cherry Garden Branch. Mr. Ricks sowed the seed on January 23, and at the Strathalbyn Bureau Conference, held on April 30 same year, he showed several plants well laden with pods containing ripe dry seeds, and remarked that for earliness and productiveness the plant completely justified the name of "Best of All."

Some of these seeds, which were kept in the Bureau office from April 30, 1894, till September, 1897, when sown, germinated as freely as new seeds.

In January, 1897, I made a test of this bean alongside the favorite "Canadian Wonder." A piece of ground was prepared, and three fairly long rows of each variety were sown side by side. They germinated well, and both sorts grew luxuriantly. The "Best of All" variety, which is much paler in foliage and dwarfer in habit, came rapidly into bloom, and on March 1 a good gathering of

pod was picked. On March 20 the first picking of pods from the "Canadian Wonder" variety was obtained. This was twenty days later, and in the meantime several gatherings were taken from the "Best of All."



In the illustration the first three rows from the left are "Best of All" beans and the row on the right "Canadian Wonder," the pods on the latter not being large enough to show through the foliage. The pods above the plants are of natural size, and are typical specimens of the "Best of All" bean.

On January 9 of the present year (1898) I made a similar test, sowing under like conditions. The plants of both varieties again grew splendidly, as our illustration shows, and on February 27 a gathering of pods from "Best of All" was effected, and it was not until March 13 that a scanty dish of beans were ready upon the "Canadian Wonder" plants. The pod of this new bean is sweet, crisp, of good flavor, and about 5 in. in length, when grown under fair conditions, and its early and abundant podding qualities leads me to believe it to be a very desirable acquisition to our list of summer beans.

## NOTES ON VEGETABLE-GROWING FOR APRIL.

BY GEORGE QUINN.

This is a busy month for the vegetable-growers upon the plains. All kinds of sowings and plantings are made of vegetables that will withstand the cold and occasional frosts of winter.

Make sowings of broad beans, red and silver beets, carrots, parsnips, cress, lettuces, parsley, peas, radishes, spinach, turnip, and swedes, in drills in the open garden. It may be necessary, in the absence of rain, to give any ground which is to be put under crop at once a good soaking about three or four days before sowing seeds or setting out young plants. This period will allow the surface to become sufficiently firm to allow of the operations being carried out with the least possible injury to the soil or plants, and certainly with comfort and despatch on the part of the gardener. These sowings and plantings are essentially for the production of early crops, and favorable situations, such as sunny slopes facing north to north-east, should be selected, and if these are protected from cold southerly winds the results will be more satisfactory. In small gardens those beds which are not shaded by buildings or fences should be selected, as it must be borne in mind that the relative positions of the earth and sun during the next few months will cause any fence or wall on the north side to throw very long shadows across the garden plots throughout the entire day, thus causing such beds to be extremely wet and cold.

The beets and lettuces should be thinned out in the rows to about 1 ft. apart, and the plants, when lifted carefully, can be readily replanted in other beds. The carrots, parsnips, radishes, turnips, and spinach should be thinned, if the seeds germinate freely; but this operation is better done on several occasions, as the plants increase in size, for frequently some unexpected cause arises to thin them without the gardener's aid. Any former sowings of these that are making good growth would be benefited by a sprinkling of superphosphate or sulphate of ammonia alongside the rows, and simply worked in by a shallow Dutch hoeing, after which a watering causes the manure to actively dissolve and become available to the plants.

Peas should be staked when about 5 in. or 6 in. high, because the more they are kept off the wet and cold ground the greater are their chances of early blooming and podding.

Sowings should be made (in seed beds prepared as described in former notes) of cabbage, cauliflower, broccoli, Savoy cabbage, Brussels sprouts, celeriac, kohlrabi, onions for green or spring cutting, leeks—these may also be sown in drills in the open garden.

Transplantings should be made of these when ready, and offsets of garlic and shallot bulbs should be put in. Judging by the prices paid for garlic bulbs for flavoring purposes, there should be a profit obtainable from small quantities, if carefully cultivated and properly stored when ripe.

In localities where early frosts rarely occur potatoes should be planted in rich free soil. Seeing that it is probable high prices will rule for this necessary

vegetable for some time it will be worth while running the risk of a possible frost bite to secure early crops during the coming season.

Where the growths on asparagus plants are yellowing off they may be cut away, and the surface of the bed mulched over with well-rotted manure into which a little common salt has been sprinkled.

A similar mulch of well decomposed manure can now be spread with advantage to the plants over the surfaces of the rhubarb beds, and lightly forked in, care being taken not to damage the roots or crowns.

Tomato bushes should now be tied up so as to expose the fruit to the sun and dry air, otherwise the cold nights will retard the ripening of the fruits. Trombones, pumpkins, and pie melons should be stored in cool dry places before the ground becomes sodden by winter rains.

Housewives should awake to the fact that tomatoes, small cucumbers, and chilies must be secured at once for the manufacture of sauces, pickles, and chutneys, otherwise the season may slip unnoticed away, and leave their jars and shelves empty for the winter. If the early crops of cabbages are attacked by green caterpillars or aphids blight make up a weak solution of kerosene emulsion, or boil up 2lbs. coal tar in a little water, and dilute to about 100galls. Spray the plants thoroughly at intervals of a few days until the pest is repressed. A decoction of Quassia chips and soft soap is also recommended.

## RESIN WASH FOR RED SCALE.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

With a view of testing in a practical manner the comparative efficacy of the remedies recommended by this Department for the destruction of red or round scale of the Citrus family (*Aspidiotus aurantii*, Mask.), I secured in August, 1896, permission to utilise some of the badly-infested trees in the orangery attached to the Adelaide Lunatic Asylum, and during that month I began applying the remedies alluded to above, viz., hydrocyanic acid gas, kerosene emulsion, and resin wash.

A block of old citrus trees, consisting of three rows, was selected, because they were evenly and badly attacked by the red scale. Each row contained nine trees, and, with one or two exceptions, were from 14ft. to 18ft. high, and of about the same diameter. Several of the trees were affected by "collar" disease, but the remainder were as healthy as trees could be under a heavy attack of this scale. The first row was fumigated with the hydrocyanic acid gas under a gas-proof tent after the manner described in our issue of November, 1897. The second row was sprayed with resin compound, and the third was sprayed at the same time with strong kerosene emulsion, and the remainder of the trees, consisting of several hundreds in a condition similar to those described herein, with few exceptions, have not been treated at any time for the repression of this pest. In the illustrations—the leaf and fruit of the lemon showing the positions—Fig. 1 is only a fair sample gathered from one of the untreated trees.

Fig. 2 represents a fruit and leaf taken from one of the trees sprayed with resin compound, in the manner to be described herein, and I wish to add that I had to search for upwards of half an hour before I could discover a leaf with any red scales upon it, and it was impossible to find a single orange—though half grown—with any scales attached.

I have frequently been told during the past summer that the unprecedented heat had destroyed the scales and prevented natural and ordinary increase, but one only need examine the untreated trees in the orangery referred to here to refute such a statement, and I shall be very glad to show the trees to anyone

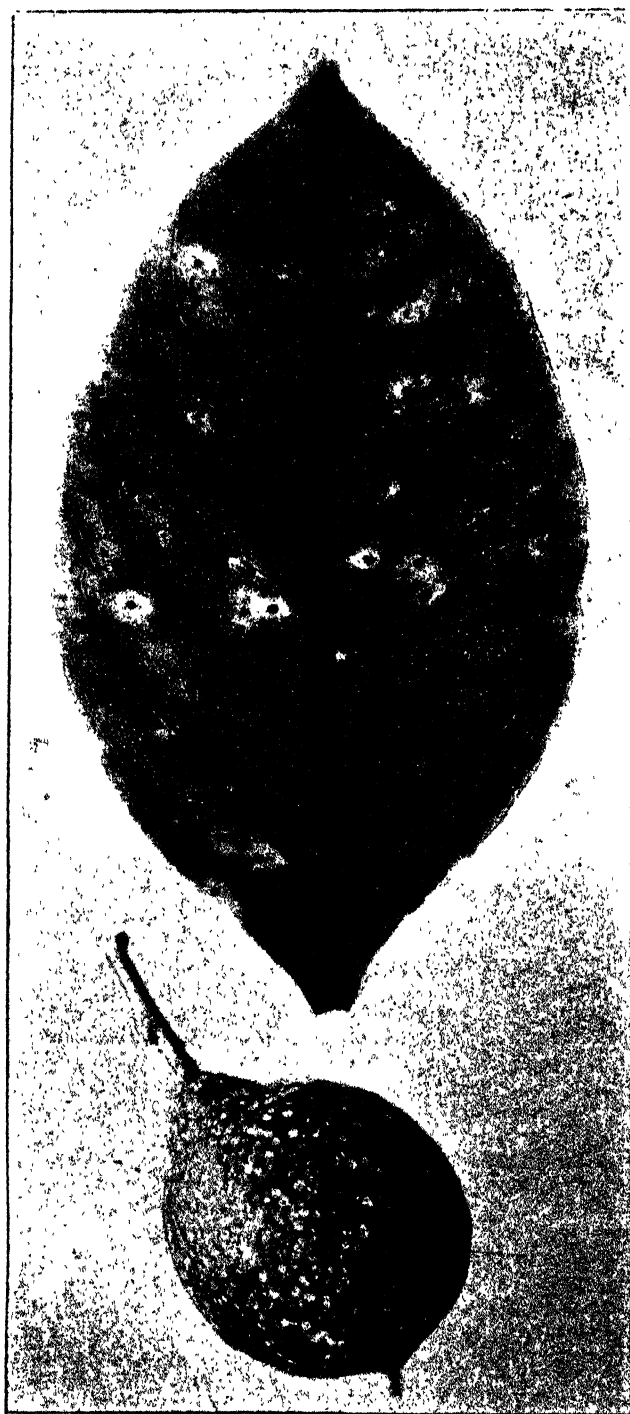


FIG. 1.



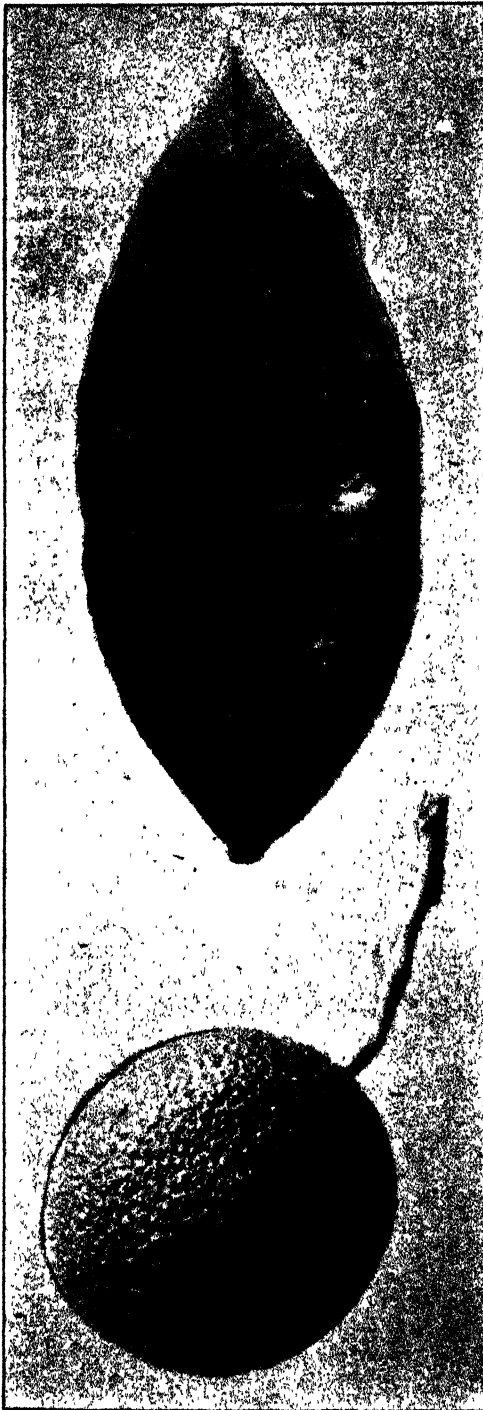


FIG. 2.

interested, so that they may judge for themselves. There can be little doubt that the severity of the season has caused a great many of the citrus trees to shed their leaves almost completely, and many scale insects must have perished in this manner, but where the trees are untreated and have retained their foliage the insects have existed in the usual manner, and spread out upon the young fruits and foliage.

The formula of resin wash used was one that I had formerly suggested to Mr. Barr Smith's gardener, and has been used by him throughout the Torrens Park orangeries with splendid results. The gardener (Mr. Evans) had used it prior to my tests, but the results had not been known. It consists of 10lbs. common resin, 10lbs. soda crystals, 5lbs. of ordinary soft soap, dissolved by boiling, and diluted with water to make 50galls. for spraying. As some growers complain that they find difficulties in the manufacture of this wash I will briefly describe the method adopted with success in this experiment. An old iron cauldron, with a capacity of about 30galls., was roughly built in with brickwork, the fire being safely confined beneath. Ten gallons of water were placed in the boiler and brought to a boil. The soda crystals were poured in and stirred until the whole was dissolved. In the meantime the resin, being placed on a sack in a wheelbarrow, so as not to scatter the particles, was with a billet of sawn wood soon reduced to a powdered condition. Then, while the boiling was still maintained, the soft soap in lumps, and the powdered resin in pannicanfuls, were added, stirring being kept up constantly the whole time. When all of the solids

were dissolved more water from the running stream or tap was added, in small quantities, to check the frothing up. In about an hour the whole was dissolved, and looked like very strong tea in color.

More water was then added to bring the contents up to the 25-gallon mark, previously made on the inside of the boiler.

While the compound was still hot it was baled out into a tank on wheels, and dragged up into the orangery.

The spray pump used was of local make, fitted with an automatic agitator, and a barrel capacity of about 16galls. Into this barrel 6galls. of the hot wash were poured, and an equal quantity of water from the tap added, making 12galls. of spray wash. This was applied through a double cyclone nozzle, and after effects showed that, though diluted in this manner by the tap water, the liquid was too hot for the india-rubber hose to remain uninjured. Though sufficiently hot to destroy the rubber, still, when the hand was held 6in. away from the nozzle scarcely any warmth could be detected.

This last remark is meant to explain how difficult it would be to apply resin wash "hot," as often recommended. The only advantage that can be claimed for the hot solution of resin would, in my opinion, be the freedom with which it passes through the nozzles when warm. This warm solution was applied in sunny weather, with no injury to the foliage. Every effort was made to thoroughly spray the trees, and to facilitate this the internal growths and water shoots arising from the main branches were carefully cut out; then, when I began to spray a tree the first act was to get inside the foliage close to the main trunk, and carefully spray outwards and upwards, so as to coat the backs or under surfaces of the leaves and twigs and branches.

The outer surfaces were then sprayed, and finally the nozzles were turned over and held beneath the lowest branches, and the spray directed upwards.

In this manner 5galls., 6galls., and 9galls. were used on some of the trees, and, different to spraying with arsenites, the wash was applied until it ran off freely, and flowed down the main branches and trunk in a frothy stream.

After spraying several trees I adopted the practice of going back to examine the trees upon which the wash had dried to look for leaves that had escaped the wash, and it was these close examinations that have led me to pronounce so strongly in favor of the cyanide fumigation, for, effective as the resin has proved, and be as careful and thorough as one may, some of the leaves escape treatment, and many scales survive unless the applications are followed closely upon each other.

In South Australia the red scale does not breed freely until about the beginning of November. The young active larvæ can then be readily detected crawling upon all parts of the infested citrus trees at any time up till the end of April. As far as I can discern they are bred most numerous when humid atmospheric conditions prevail.

I began spraying with the resin wash on September 8, 1896, while the insects were yet in a dormant or non-breeding stage. This spraying seemed to have but very little effect.

Circumstances prevented any further spraying until April 7, 1897, and by that date the half-grown fruits were badly encrusted by the scales in all sizes and stages of growth. This application was very effective upon these—as yet soft scaled insects. The third application was given on May 7, the fruit having almost reached its full size, and some had begun to color slightly. On this occasion the nozzles were directed upon the fruits very carefully, and every effort made to drench the fruits on all their surfaces.

This third application was very successful indeed, and by the time the fruits were gathered—a couple of months later—scarcely a living red scale could be found upon them. In many instances the dead pupariums simply scaled off,

and the indentations where the defunct scales had been cast off were scattered over the fruits very abundantly. These did not affect the appearance of the fruits, and unless told an inexperienced person would not have noticed anything out of the ordinary. The only defacement caused by the wash was a white soapy patch at the bases of some fruits, where the wash had run off and the last globule had congealed and dried up. The almost entire absence of rain between the last spraying and the ripening period was, in my opinion, mainly responsible for this stain remaining.

From these tests and from careful notes made of the results obtained by private growers around Adelaide, I am led to believe that the resin wash is the cheapest and most effectual spraying compound that has yet been used in our climate for this persistent and difficult pest, but the applications must be thorough, and must follow each other closely.

When my first spraying was given in September the young twigs of the trees were simply black with masses of orange aphides, but the resin killed them absolutely.

The cost of the resin wash mentioned herein—reckoning the *materials only*, when purchased by the cwt.—is 3d. per gallon, and the formula allows  $\frac{1}{4}$  lb. of solid for each gallon. The cost of materials to make a gallon of kerosene emulsion sufficiently strong to kill red scales is 1½d. Resin wash can be safely applied in hot sunny weather. Even when the thermometer registers close on 100° in the shade no harm will be done to the trees if they are *well supplied with moisture at the roots*. This precaution is absolutely necessary, for in tests made by myself, trees showing signs of distress through drought lost every leaf after being sprayed with resin and kerosene emulsion, while others in a normal condition remained uninjured when treated from the same tanks of wash.

One peculiarity noted in these, and in the applications of resin wash made by private growers around Adelaide to lemon trees, is that it seems much more difficult to destroy the *Aspidiotus* on the fruits of the lemon than on those of other citrus trees.

## ORCHARD NOTES FOR APRIL.

By GEORGE QUINN, INSPECTOR OF FRUIT.

Practically nothing in the way of cultivation can be done in the orchard during this month. The harvesting of late pears, apples, and grapes will probably end with April this year. The grower who is fortunate enough to have a good supply of apples or pears of storing varieties will in all probability reap handsome profits as the winter progresses. It is therefore well worth going to considerable trouble, not to say expense, to see that these fruits are harvested with the utmost care, and stored as safely as experience and intelligence can devise. No fruit that falls to the ground should be stored among the sound hand-picked specimens. It has often occurred to me that one of the usually unnoticed advantages which a well-cultivated, finely-pulverised surface around the trees gives, is that any fruits that may fall into such a yielding surface, sustain far less injury and give better returns as “inferiors” than similar windfalls in a roughly broken cloddy orchard.

Pears require exceptionally careful handling, as their skins are so very brittle that a gentle blow, which would make a slight dint in an apple that may afterwards dry up, only leaving a discolored spot, will fracture the skin of a pear, and open the road to decay at once.

Any spare time could be utilised in preparing the ground for planting during the coming season.

Many people advocate planting citrus trees in the autumn, but I am led by my experience to advocate early spring planting. However, should it be done now, care must be taken to plant them well up on the surface of the ground.

In the nursery the ties should be loosened from budded stocks, or removed entirely where the union of bud and cambium layer of the stock seems complete. Do not under any conditions cut away the top growth of the stocks from above the bud now, or attempt to force growth from the buds of deciduous trees.

The pips or stones of various trees should be planted thickly together in good free soil in boxes, so as to start them.

Deciduous trees should now be allowed to mature their growths and buds. No attempt to induce further growth should be made, as very often these late growths on peaches, &c., "die back" in spring. Any superfluous moisture supplied now, while the ground is warm, is likely to cause apple trees to break into bloom prematurely in winter.

Now is a first-rate time to apply resin or kero-sine sprays to citrus trees to destroy red scale. This matter is being dealt with in a separate article in this number. Anyone desirous of trying the cyanide process of fumigation for the suppression of this pest cannot find a better time than the autumn for the work. A fully illustrated article on this appeared in our November issue of last year.

The breeding season for codlin moth is now pretty well over, but care should be given to the bandages, even for some weeks after the fruits are all gathered, with a view to entrapping stray specimens. All stakes used for propping heavily laden trees should be either disinfected or burnt, as the cracks in these are favorite shelters for the larvæ. I wish to repeat my former statements respecting the necessity for constructing all fruit storehouses in such a manner as to allow as little shelter for codlin larvæ as possible, and at the same time the houses should be constructed so that they may be closed entirely at will. By adopting such measures immense numbers of moths may be caught and destroyed in the following spring, for the caterpillars when leaving the stored fruits will hide themselves through the winter in most minute crevices, from whence they emerge as moths in spring. This is a much proved fact, and one large grower assures me he constantly destroyed moths in his empty fruit house from September until the following February. This bears out my former statements respecting the long period over which the hatching of a brood of these moths extends.

Dried fruits of all kinds must be kept in close bins or boxes to prevent the larvæ of the various noxious moths injuring the samples.

## TUBERCULOSIS.

There are important movements being made in all the colonies to check the spread of tuberculosis. Whilst South Australia was the first colony to place the "disease" under the Stock Act, and provide means for the destruction of diseased animals when found, it has not been followed by any systematic action for the testing of animals with tuberculin or for obtaining as much value as possible from the carcass.

In New Zealand the authorities are moving in the right direction. Cattle are tested with tuberculin, and if the inspector decides the beasts are unhealthy the animals are destroyed. The following case is reported from New Zealand:—Mr Drummond, Stock Inspector for Hawke's Bay, accompanied by Mr. Park, Government Veterinary Surgeon, and Mr. Sabin, veterinary surgeon, of Hastings, recently inspected some sixty head of cattle belonging to Mr. Evans, of Pukahu, and administered to them the tuberculosis test. Finding a reaction the test was repeated some days afterwards with similar results. Inspector

Drummond advised Mr. Evans of his decision that it would be necessary to kill those cattle, viz., thirty-five head, which had shown the reaction. The Act designs, and the Stock Inspector states, that if the beasts are healthy the department will refund the whole of the valuation of the cattle, but if otherwise half the value only. Unhealthiness is described by the Act as consisting of tuberculosis, actinomycosis, anthrax, cancer, rabies, and pleuro-pneumonia. The cows, with five other suspected beasts, were killed in the usual way. On being opened they were carefully examined by Inspectors Park and Drummond, and the condition of each separately noted. Of the forty killed thirty-eight were found to be suffering from tuberculosis, and two from actinomycosis. One of the last two mentioned was in such an advanced state of disease that steps were taken to have a photograph taken of the carcass before being sent to the injector.

The old method of disposing of the carcasses of condemned cows was by burying and burning. The first was not safe, the germs remaining in the earth, whilst the second was both expensive and troublesome. Both are wasteful. The alternative is the digester, by which, short of allowing any portion of the meat to be used as food, the entire carcass is utilised. The horns and hide are not infected, and therefore are useful as with any other beast. Neatsfoot oil is extracted from the feet. The carcass is roughly cut up into small pieces, loaded into trucks and conveyed from the slaughter-house to the boiling down works. The portions of the carcass are then shovelled into the boilers or injectors. These are large iron vessels, about 20ft. high. They are cylindrical in the middle and conical at the bottom and top. Some idea of the size of these boilers, of which there are several, may be gathered from the fact that each one will hold the meat of four beasts. In the top cone is a small door, through which the meat is flung. After being securely fastened up steam is injected to a pressure of 55lbs. for four hours, by which time all organic germs of disease are destroyed and the meat and bones reduced to manure. So complete is the process that the whole of the gelatine is extracted from the bones, leaving practically only the lime, so that the bones can be powdered quite easily. The fat is driven off by steam through pipes into refining tanks, from thence to a large cooling vat.

In Victoria the Health Department have instructed the veterinary to demonstrate to farmers, dairymen, and others the value of tuberculin as a test for the discovery of tuberculosis in their herds. During the month at Warnambool, says the *Australasian*, "a large number of dairymen and graziers assembled yesterday at Mr. T. M'Cullough's slaughter-yards to witness the killing of five dairy cows, which had been pronounced by the Government veterinary surgeon, Mr. S. S. Cameron, to be affected by tuberculosis. By arrangement with Mr. Walter Manifold, of Wollaston, Mr. Cameron had subjected his herds to the tuberculin test, and found that nine cows were affected by the disease; all of these were in one herd of thirty-nine cows. Thirteen other animals in the home herd were not affected. Four of the condemned animals were destroyed on Monday, and the *post-mortem* examination disclosed that they were very much diseased. Dairymen and others were invited to witness the slaughtering of the remaining five cows yesterday, and those who attended watched the proceedings with intense interest. All the animals were young, apparently healthy, and in good condition, and such remarks as 'a shame to kill such cows' were frequently heard. The first two cows killed were found on examination to be only slightly diseased—a few nodules in the liver and small abscesses along the glands of the bowels, but a lump full of germs was found under the tongue of each. The third animal showed only the slightest indications of disease; the fourth was affected in the liver and bowels, but not in an extensive degree. The fifth was badly diseased, being extensively affected in the lungs, glands, and intestines.

Mr. Cameron considered that the fact of the tuberculin having demonstrated the existence of the disease in all the animals, even when in its early stages, was eloquent evidence of its reliability. This he regarded as of supreme importance to dairymen, in that it apparently gave them an opportunity of dispensing with beasts from their herds when they were affected in the early stages, and before they could contaminate any of the remainder of the herds. Mr Cameron afterwards addressed those present, pointing out how tuberculosis was intercommunicable, and could be conveyed from man to cattle, from cattle to man, from cattle to cattle, from cattle to pigs, and from pigs to cattle. He had gone through several herds, and the percentage varied very much—as low as 3 per cent and as high as 30 per cent. The object of the Health Department was not to harass dairymen, but their object in sending him to the different districts was to demonstrate the extent of the disease and to prove to them that it did exist. They also wanted to show that the disease could be found out, and to demonstrate the efficacy of the tuberculin test. The public should be aroused to the seriousness of the position, and then the Government would be induced to make an attempt to devise a scheme aiming at the eradication of the disease. He deprecated ‘hushing up’ a matter of this kind. It had been argued that the publication of this matter would be injurious to the export trade, but they would not get the remedy until the facts as shown to day were most widely known, and a genuine public opinion created. In his opinion it would not injure their trade with either the English or local consumer. In the case of English consumers they would support a country where efforts were being made to minimise the trouble. They would appreciate an article from the country in which action was being taken to stamp out the disease rather than that from a country where they knew the disease existed and no efforts were being made to eradicate it.”

## THE FARM.

### SEASONABLE NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,  
ROSEWORTHY, SOUTH AUSTRALIA.

Seedtime is at hand. In northern districts much wheat is already sown, and lying in readiness for long longed-for rains. In middle and southern districts it is the better practice to wait for rains before sowing, unless, as was the case last year, the autumn rains come hopelessly late. On the College Farm, with good April rains, we will begin sowing in the last week of April; but should such rains not fall, we will wait patiently for them—at least as patiently as possible—until the third week of May, rather than sow before the rains come. Early seeding is good practice undoubtedly, provided the land has had a good soaking from rain; but early seeding on dry land has many drawbacks. First, the land will be more or less foul, and the crop will suffer in proportion. It is not sufficient to have killed all weeds that germinated during the process of winter fallowing. This summer's duststorms will have fouled the surface of most fallows, and as the winter was so dry a good germination of seeds of weeds was not obtained, and late fallows are almost bound to be dirty. By waiting for rains, and delaying seeding until the weeds are through, one crop can at least be cleared off. Second, land sown dry is liable to takeall, and, at least on light brashy mallee lands, the crop throughout its lifetime is relatively unhealthy. Third, the first rains may be only sufficient to soften and spoil the grain—not

sufficient to bring it through or give it a good start. Fourth, when sufficient rain has fallen to bring the seed through, but not to soak the soil sufficiently, the crop may get a check by a succeeding dry spell. Fifth, there is more risk in pickling wheat when it has to be sown on dry land, although dry seeding in average years lessens the risk of bunt, apparently because the faint degree of moisture present germinates the spores which may have been sown with the grain, while it does not germinate the wheat, and the mycelium from the spores, finding no host ready, shrivels and dies. Let it not be thought that this is arguing against early seeding—it is dry seeding that is being questioned. In favorable seasons there is no question of the advantages of early seeding. In such seasons, if all the wheat sown north of Adelaide could be got in before the 10th or 12th of May, many tens of thousands of pounds would not measure the gain to the colony.

It behoves all farmers to select carefully their seed wheats. A good proportion should be of some early variety—(1) Because they yield better after a dry spring such as we have had during the last three years; (2) because by maturing early they may escape rust altogether, or be relatively little affected. Early Para, Burt, King's Solid Straw, Allora, and Steinwedel are useful in this relation. A part of the crop should be of some variety more rust-resisting, so as to be prepared for contingencies. Leak's, Australian Wonder, Ward's Prolific, and Defiance offer a selection from this point of view as likely to withstand rust better than many varieties extensively sown. A block of flinty wheat, such as Medeah or Belotourka will bring delight to the grower should rust prevail in the spring, even though the grainbuyer may dock the price 2d. or 3d. per bushel compared with the price of soft white wheats, as they will come through conditions favoring the spread of rust with impunity. The work of Mr. Farrer, of New South Wales, in this connection is pregnant with importance. Although we have had no rust for three years that work is not in abeyance; it has been going on, and should rust unfortunately prevail in the future season much will, I believe, be legitimately heard of it. Another question which should not be overlooked in discussing, however briefly, the selection of seed wheat is that relating to the strength of the flour likely to be derived from the particular variety of grain. Millers and grainbuyers and their agents might, I think, offer more information on this question. A quotation such as the following should be interesting reading to farmer and miller alike:—"Flour is selling at £11 10s. to £11 15s. for New South Wales roller, £10 15s. to £11 for New Zealand, and £12 15s. to £13 5s. for Manitoba." This is the quotation for Sydney market as given in the *Australasian* for December 4 last. Manitoba flour £1 5s. to £1 10s. per ton higher than New South Wales flour. How much does the variety of wheats grown account for this difference? Is the persistent favoring of large-berried soft white starchy wheats by grainbuyers tending to the depreciation of our flour from the baker's point of view? The last question is well worth careful consideration by the Chamber of Commerce. Agricultural societies also by judging the merits of wheat competing for prizes on a very limited scale of points, such as weight per bushel and external appearances largely, do not offer so much information to their members as is desirable. What weight of flour can be obtained from a given number of bushels of the competing wheats, what number of loaves can be baked from a given quantity of the respective flours obtained, and of what quality is the bread in each case made under the same conditions from the several flours are questions which such societies might endeavor to solve with the view of informing farmers more thoroughly of the merits of the varieties of wheat exhibited, and questions which if fully answered would help much to keep up the quality of our flour.

Last season a very large quantity of wheat was more or less damaged in the

colony by the presence in the crop of bunt or stinking smut. This may occur (1) from carelessness in pickling, (2) inferior quality of the fungicide used, *e.g.*, impure or adulterated bluestone, (3) using a solution not sufficiently strong.

If the seed be carefully pickled with a solution of bluestone, using from 6ozs. to  $\frac{1}{2}$  lb. to the bag, very little bunt will be found in the crop. Of course the pickled wheat must not again be contaminated by being placed in bags in which has been bunted grain. Bags should, indeed, be steeped in an extra strong solution, or boiled in water. To dry the pickled wheat with a sprinkling of air-slaked lime is a good practice. Chemical reaction takes place between the copper sulphate and the lime, resulting in copper hydrate, basic copper sulphate, and gypsum, and the copper hydrate so obtained adheres better to the grain and is efficient against the mycelium of spores for a longer time after sowing, since it is not washed off by the soil moisture as is copper sulphate. Instead of working roughly with  $\frac{1}{2}$  lb. bluestone to the bag it is better to make a solution of definite strength and steep the grain therein for a short while. —1 lb. of bluestone to 10 galls. of water is 1 per cent. solution. I use this strength when there is no evidence of bunt in the seed, and stronger proportionately as evidence increases. To dry with quicklime makes the seed difficult to run through the drill, and I therefore rarely treat it with lime. Here are some of the practices of other countries:—In Germany, Kuhn's method is much followed—The grain is steeped from twelve to sixteen hours in  $\frac{1}{4}$  per cent. solution of sulphate of copper. This practice is severe on the grain and kills a considerable percentage of seed. In France, Dombaste recommends the sprinkling of the grain in a heap with a solution of 8 lbs. of sulphate of soda to 10 galls. of water, turning the heap frequently during the process, and following this by turning the heap and dusting with about 2 lbs. of quicklime powder to the bushel of wheat, so that the grains are regularly powdered. This treatment has been practised with much success in France.

The following prescription has been recommended as less likely to injure the seed:—"Immerse the seed in solution of 1 lb. bluestone in 24 galls. of water for twenty-four hours, and then put the seed for five or ten minutes into lime water, made by slaking 1 lb. of good lime in 10 galls. of water." The drawback to this practice, it will be noticed, is the time taken in the process.

What is known as the hot water treatment was first introduced by J. L. Jensen, of Denmark, in 1887. The seed is immersed in water at  $132^{\circ}$  to  $133^{\circ}$  F., for fifteen minutes. This treatment has been found to kill the spores without endangering or injuring the seed. To ensure the maintenance of the water at the desirable temperature (it must not fall below  $130^{\circ}$  F., or rise above  $135^{\circ}$  F.) it is well to have two coppers going in which water is maintained in one at about  $120^{\circ}$  or  $125^{\circ}$  F., and in the other at the standard temperature,  $132^{\circ}$  to  $133^{\circ}$  F. The wheat is dipped in the first to be warmed, so that it will not reduce the temperature of the second while undergoing the scalding. The seed to be treated is placed in gunny bags or wire baskets; dip the bags or baskets for a few moments into the first vessel several times. This dipping and raising in quick succession secures the moistening of each grain, and the total time taken need not exceed one minute. Then plunge the bag or basket into the second copper, and let it remain there with an occasional agitation for fifteen minutes, regulating the temperature by pouring in hot water sufficient to keep the temperature at  $132\frac{1}{2}^{\circ}$  F. Then remove it, plunge it into cold water, and lay out to dry. It is important to see that the quantity of hot water is several times the volume of the wheat immersed in it.

This last method of treatment for bunt (stinking smut) has the advantage that it is much more efficient for loose smut than the bluestone method, and can be used with much success against the loose smut of oats and barley, while bluestone is far from successful. For oats Jensen recommends steeping for ten



minutes, and spreading out at once to dry, thus neglecting the cooling in cold water.

Farmers who use bluestone would do well to see that they obtain a good reagent.

### Artificial Manures.

The extension of the use of artificial manures is proceeding with most gratifying rapidity, but there may be in the drier districts some danger of being too sanguine. Where the average rainfall is 13in. or 14in., or under, some caution will be required to avoid being led by the results obtained under other conditions to incur expense before it has been proved to be profitable to use manures under these conditions. The drier country, I believe, can be worked most profitably in wheat and sheep, taking a crop only in three or four years, and that invariably after fallow. The crop is so frequently limited by drought that where not more than one-fourth of the farm is cropped it will take a long series of years to appreciably exhaust the land. At any rate the introduction of manures in such districts for a year or two should be merely tentative, and if after fair trial it has been found possible, then, of course, a drill can be purchased. In the meantime, in these districts it should not be forgotten that "Fools rush in where angels fear to tread."

Over the greater part of the colony, however, where farming is practised I have not the slightest doubt that while things are at all such as they are now judicious manuring can be made profitable, and a means of improving in a vast degree the general prosperity of the community. In evidence of this I will say that each ton of manure carried out on the railways may fairly be expected to be the means of an increase of wheat to the extent of upwards of  $1\frac{1}{2}$  tons to be carried back, or of upwards of 7 tons of hay. It is in the districts where the rainfall is sufficient to enable the crop to make full use of the manurial dressings that money will more especially be made from the use of manures. The one cause likely to lead to disappointment is rust. A manured crop is likely to suffer more proportionately than one unmanured. Accordingly, where manures are used, and extra expense incurred on the crop, there is more need for care in the selection of varieties of seed wheat.

I mentioned in last month's notes that phosphatic manures are most demanded by our soils. This is the case (1) because the practice of unrelieved wheat-growing has led to the exhaustion of phosphoric acid, (2) because fallowing, practised in the first instance that one year's moisture on fallows might eke out the moisture of the next year when the land was in crop, is a means of increasing in the soil the amount of available nitrogen—this nitrogen is not leached out by excessive rains, or carried away, as nitrates in drainage water, for no under drainage is required, and consequently there is less demand for nitrogenous manure; (3) because wide areas of our soils cannot be considered rich, even on the day they are cleared. A large area of brashy weak limestone is farmed, which almost right away after the first crop would be benefited by the use of phosphates. Analyses of soils which have come under my notice very frequently show under .02 per cent. phosphoric acid, as they are now.

Of phosphatic manures in the market, through the kindness and courtesy of the manure importers and distributors, I am able to give a list of quotations now ruling. The variety of name and nature of the phosphatic manures perplexes the average man who has not had much experience, but he will discover the most suitable manure for himself after all more easily than he could select the most suitable bicycle. "Soluble phosphate" means really the percentage of phosphate of lime rendered soluble by means of acid. There are three kinds of phosphates of lime, which have been tabulated thus—

#### 1. Lime

Lime      Phosphoric acid = Tricalcic phosphate.

Lime

This, with three parts of lime and one of phosphoric acid, is the normal phosphate of lime, and occurs in bones, mineral phosphates, guano, basic slag, &c. It is insoluble in water, and is the form in which the equivalent of other phosphates is generally stated.

2. Lime }  
 Water } Phosphoric acid = Bicalcic phosphate.  
 Lime }

This has two parts of lime to one of phosphoric acid. The place of the third part of lime in the natural phosphate (1) is taken by water. The bicalcic phosphate is insoluble in water, but is, in respect of solubility, somewhat midway between the tricalcic form, which is insoluble in water, and the monocalcic form, which is soluble.

3. Water }  
 Water } Phosphoric acid = Monocalcic phosphate.  
 Lime }

There is one part of lime and two of water to one of phosphoric acid. It is soluble in water, and is formed by treating the tricalcic phosphate—the natural phosphate—with sulphuric acid, which takes away two parts of lime to combine with the acid and replaces them with two parts of water. This form is really and truly “soluble phosphate,” but in the manure trade the phrase “soluble phosphate” has come to mean the amount of tricalcic phosphate that would have to be acted upon by sulphuric acid to give the soluble salt.

In an analysis of a superphosphate it may be stated to contain 16.6 per cent. soluble phosphoric acid, and this may be further given as equivalent to 36.2 per cent. phosphate of lime soluble in water. But this 36.2 per cent. is not monocalcic phosphate; it represents the amount of tricalcic phosphate which would have to be acted upon—rendered soluble—by sulphuric acid to give the soluble form in sufficient quantity that the phosphoric acid in it would be 16.6 per cent. of the whole material. The percentage of monocalcic phosphate which 16.6 per cent. phosphoric acid would be equivalent to is 27.3 per cent., and of tricalcic phosphate, 36.2 per cent.

The amount of tricalcic phosphate rendered soluble to which any percentage of soluble phosphoric acid may be equivalent can be obtained by multiplying by 2.183. Thus, if the analyst states that a manure contains 17 per cent. soluble phosphoric acid, and the manure merchant has guaranteed it 36 per cent. to 38 per cent. soluble phosphate, the two statements correspond, for  $17 \times 2.183 = 37.1$ . The analyst gives the percentage of phosphoric acid soluble, while the manure merchant gives the percentage of phosphate of lime (tricalcic) rendered soluble.

I mention this matter as I have so many inquiries asking for information in explanation of the apparent difference.

From the following table it will be seen that there is no lack of variety of phosphatic manures ready to our hand. To decide which to buy depends upon the value of the manure relatively to the price at which it is quoted for the particular conditions of soil for which it is wanted. Superphosphate I believe will be found peculiarly suitable for most of our farming lands, and the best results are likely to be obtained from it as a general rule. On the College Farm the highest yields have been obtained from superphosphate; but I would point out that so far I have not had the residual values of the manures on the second and third crops succeeding a dressing worked out sufficiently to justify me in making a definite statement. I have the work in hand, and two years hence will be able to speak with more authority. I have used and experimented with basic slag or Thomas phosphate, guanos, bonedust, &c., but superphosphate has, I think, as far as I can say without having residual values measured, given most remunerative results. Let it be understood, however, that the

College land is largely sand dune and brashy limestone, with a remainder of stronger mallee soil.

On peaty lands, such as prevail at Millicent, bonedust or basic slag might be expected to give better results than superphosphate, and on strong clay lands which are somewhat deficient in lime. From the table below it will be seen that the price of the unit of tricalcic phosphate is very low in the guanos quoted for. One would expect that at anything like these figures they ought to prove relatively profitable. To take up this matter of valuation would necessitate continuing these notes to too great length. Another opportunity will no doubt offer for this.

The following is the table :—

*Phosphatic Manures on the South Australian Market.*

Name of Manure.	Quality.	Price.
English superphosphate .....	36°/o-38°/o	£5 per ton (net cash)
Ohlendorff's superphosphate ....	35°/o-37°/o	£5 "
Sugar Company's superphosphate	35°/o	£5 10s. per ton
Adelaide Chemical Works' super.	34°/o sol. phos., 3·9 °/o nitrogen	£5 15s. "
English superphosphate .....	26°/o	£4 10s. "
Sugar Company's No. 2 manure..	33°/o phos. sol., 2°/o ammonium, 1°/o potash	£6 10s. "
Sugar Company's No. 3 manure..	28°/o phos. sol., 4°/o ammonium, 2°/o potash	£7 10s. "
Bonedust, Reliance .....	48°/o phos. lime, 3°/o-4°/o ammonia	£5 "
" Chemical Works' ....	47·5 °/o tricalcic phos., 3·7 °/o nitrogen	£5 5s. "
" Mehrtens' .....	—	£5 "
Kangaroo Island guano .....	46·7 °/o tricalcic phosphate	£2 5s. "
Albrohlo's guano .....	50°/o-60°/o tricalcic phosphate	£3 10s. "
High grade superphosphate ....	42°/o phos. acid sol. = 91°/o phos. sol.	£12 "
Thomas phosphate flour .....	18°/o phos. acid = 39·2 tricalcic phosphate	£3 15s. "
" " (star brand)	17°/o-20°/o phos. acid	£3 15s. "
Guano phosphato.....	15°/o phos. acid, traces ammonia and potash	£3 "
Ohlendorff's dissolved guano ....	20°/o tribasic phos. (made sol.), 2·5°/o phos. insol., 6·25°/o ammonia, 2·73°/o potash	£14 "
Guano superphosphate .....	22·68 °/o tricalcic phos , 2·05 °/o nitrogen	£3 15s. "

I wish to say a word warning farmers against mixing manures without judgment. For example, to mix superphosphate with lime to dry it is to undo the solubility in proportion to the amount of lime used. Similarly, mixing with wood ashes is a mistake unless done and applied at once. Even then I would say that it will be better to apply the two manures in succession. Do not mix sulphate of ammonia and Thomas phosphate, and do not mix nitrate of soda and superphosphate. Either of these mixtures will mean a loss of nitrogen, the most valuable manurial element in the market.

A word as to quantities to apply. The prevailing practice is to apply altogether too light dressings. There is no risk of loss by having phosphoric acid in excess in the soil. To get full value from it it should be in excess. It is not enough to say that the wheat crop removes from 10lbs. to 20lbs. phosphoric acid, and therefore to apply a manure that will return this exhaustion is sufficient. It is not so, and a little more experience will teach those otherwise who now think so.

For several years phosphoric acid should be applied in excess, so as to get excess in the land. When that is obtained the plant during favorable growing weather can take up more than its immediate wants of phosphates, so as to help it over an unfavorable or dry spell, but if the phosphates are not present in relative abundance it cannot do this, as the phosphates in the soil are in an

insoluble form, rightly speaking, and unless an excess came into use very slowly.

I very strongly recommend that 140lbs. should be considered a very minimum dressing of superphosphate, and would urge farmers who have fair rainfalls, say 17in. to 21in. average, to use 2cwts. per acre until they find their land fully replenished. On our best country 3cwts. per acre will pay better than 2cwts. in the long run.

In next month's notes I will continue this subject.

## BRANCH SHOWS.

### MEADOWS.

On Wednesday, March 16, the annual industrial and produce show in connection with the Meadows Branch was held. Considering the season the show was most successful, and was well attended, over 700 people being present.

The show of flowers, fruit, and vegetables was very good, while there was also an attractive display of dried and preserved fruit, jams, jellies, pickles, &c., most of which were of the highest quality. In the culinary section there was a very comprehensive show, but dairy produce was poor, there being no entries whatever of bacon. Of fodder plants there was a splendid collection, some maize exhibited by Mr. G. Usher, of Bull's Creek, being 12ft. 6in. high. Samples of ensilage were also exhibited. The exhibits of fancy work and pot plants were good, and helped to make a very attractive display.

### CHERRY GARDENS.

During the past three years the Cherry Gardens Branch has organised shows of produce and industries of the district. This year the Clarendon and Belair Branches were asked to co-operate, and on Thursday, March 17, the combined show was held at Cherry Gardens. The show was very successful, and over 450 persons paid to enter the building.

The exhibits were largely shown in sections, prizes being offered for best exhibits of products of the farm and dairy, the orchard, and the garden, of home industries, and of six apples and pears, and three samples of home industry. The prizes consisted of handsomely-framed pictures with suitable inscription, and were eagerly competed for. No money prizes were offered except for competition among the young folk, and a few special prizes offered by individuals. Apples made a splendid show, and preserved fruits were also good. In the section exhibits the visitors were the judges, each receiving a ballot paper. Messrs. M. C. Lewis and C. Lewis took first and second prizes respectively for the farm and dairy section; Messrs. S. Chapman and J. and C. Lewis first and second in orchard section; Messrs. J. Choat and C. Ricks for garden; Mrs. T. Jacobs and Mrs. R. Brumby for home industries; while Mr. J. Choate secured the prizes for mixed collection of apples and pears and home industries. Some first-class dairy cattle were shown, also miscellaneous exhibits of jams, vehicles, cabinet-work, &c., not for competition.

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**WORTH TRIAL.**—A grower in the South-East had some Doradilla grape vines for the fruit of which he had no liking, so he cut them down and grafted Carbenet vines upon the stumps. The latter is a shy bearer and generally produces small bunches, whilst the Doradilla produces several very large bunches of fruit. When the Carbenets began to bear upon the Doradilla stocks the yield was much increased, and the bunches were of very large size. The question now is, Will the improvement be continuous?

## SOUTH-EASTERN CONFERENCE OF THE AGRICULTURAL BUREAU.

HELD AT BORDERTOWN ON MARCH 16.

The Fifth Annual Conference of the South-Eastern Branches of the Agricultural Bureau was held at Bordertown on Wednesday, March 16. There were present from the CENTRAL BUREAU—Messrs. F. E. H. W. Krichauff (Chairman), Professor Lowrie (Principal of Roseworthy Agricultural College), and A. Molineux (Secretary); MOUNT GAMBIER—Mr. J. Umpherston (Chairman) and Stock Inspector Williams; PENOLA—Messrs. D. McKay (Chairman), F. Ockley, W. Miller, D. Balnaves, and T. H. Artaud (Hon. Sec.); NARACOORTE—Messrs. J. Wynes, H. Smith, and S. Schinckel; TATIARA—Dr. M. Gibbes, and Messrs. G. Ferguson, G. Milne, H. Killmier, R. Scown, Thomas Stanton, M. Whelan, W. E. Fisher, E. Prescott, J. Rankine, W. Montague, J. Green, F. Hall, and D. Makin; besides from 150 to 200 visitors.

### Exhibits.

A very large and representative collection of exhibits was tabled in the Institute, those from Penola and Tatiara being especially good.

The Penola exhibits were principally of fruit. The Fruit Colony (Coonawarra) was represented by ten exhibitors, who showed between them forty-one varieties of apples, besides pears, peaches, plums, almonds, grapes, different vegetables, wines, &c. From Penola itself the exhibits consisted of fruit, vegetables, fodder plants, flax, walnuts, cheese, &c. The total number of exhibits sent by this Branch was 147.

The Tatiara exhibits were principally of cereals, the grain being shown in sheaf and thrashed. They were all labelled with names of growers and items of interest connected with them. Some comparative exhibits showing difference between manured and unmanured crops created much interest. Wheat, oats, rye, field peas, linseed, kale, sorghum, and maize were shown in this section. There were also splendid exhibits of fresh and preserved fruits, jams, vegetables of various descriptions, almonds, &c.

Mount Gambier Branch sent apples, chestnuts, potatoes, onions, marrows, wheat, barley, and oats.

Naracoorte Branch showed eighteen varieties of apples, grapes, marrows, and pumpkins.

Millicent Branch showed collection of apples and pears, White Tuscan wheat, Cape barley, and plant of saltbush.

Lucindale Branch sent some well-dried currants, grown and dried by Mr. S. Tavender.

### AFTERNOON SESSION.

Mr. G. FERGUSON, Chairman of the Tatiara Branch, took the chair, and welcomed the visitors. In his opening address he made the following remarks:—

This is the first Conference we have had in the Tatiara, and he hoped and trusted it would be interesting and instructive. He could not help saying that considering the importance of the industry we represent the Government are not so liberal as they should be. In none of the other colonies is so much good done at so small a cost. If the Branches were allowed, say, £5 a year it would be a great help to their usefulness. It seems unfair when a member takes exhibits to a Conference that he should have to pay costs out of his own pocket when it is for the benefit of the whole district, and in other matters too a few shillings would help greatly. He strongly recommended the *Journal of Agriculture* to our farmers, which, he said, only required to be read to be appreciated. Farmers, as a class, were very slow to move out of old

grooves, but the *Journal* and Bureau had, and would, move them on. Take the seed and manure drill as an instance. See how much crop was put in with the drill in the Tatiara last year, thanks largely to their old friend and member, Mr. Prescott, who agitated for it at the meetings of the Branch. Because of the success of drilling last season a large portion of the Tatiara would be drilled in this year. Who could estimate the benefit to the farmers in that district alone through the increased yields? He believed the drill would make farming pay, for they would have larger yields from a smaller area of land. He was a great believer in drilling. Over forty years ago, when his father was sent by the Adelaide Agricultural Society to the old country to bring out the first entire horses and mares to South Australia, he brought out with him a small seed drill, and he never saw nicer or more even crops than were put in with that drill; but it was put aside as being too slow, and that was the complaint now, even with large drills; but if farmers would put in well a smaller area it would pay better than a large area put in badly. Then again, dairying helped the farm to pay, especially if a farmer had a family to do the milking and he kept pigs in connection with it. The amount of money that had gone out of the colony this year for butter, cream, and eggs was a very large amount. He was pleased to see by the papers that the Minister of Agriculture had engaged an expert in dairying, who, no doubt, being just from the old country, would have the knowledge of all the latest discoveries and improvements in dairying. To make a success of dairying they must provide food for their cows in certain times of the year. By the use of the binder they got a good stack of straw and chaff, which, although of little use for milk, would keep the cattle in good heart. He was very pleased to know that farmers' wives were turning their attention to the drying and preserving of fruits. It was necessary now for both farmer and wife to economise in every branch. What with bad seasons and low prices farmers for the last few years had had a hard struggle, but he hoped the present good prices would continue, and that they would have a return of good seasons to compensate for years of unpaid toil.

Mr. MOLINEUX said there was a good opening for dairying in the South-East, but it was very necessary that proper food for the stock should be provided. There should be more co-operation amongst dairymen. A number of farmers owning 100 or more cows might unite to purchase milking machines, and by their use save much time and trouble. They stripped much cleaner than hand-milking.

THE CHAIRMAN thought that the fault of these machines was that they did not strip clean.

Mr. MOLINEUX said that was improved by means of the pulsating machines. Farmers could also go in very largely for pig fattening in connection with the dairying. In this connection he referred to the mild curing of bacon, which he highly commended. There was a great opening for such bacon in Western Australia.

Mr. KRICHAUFF did not think that such low prices for wheat would ever occur again. As for other descriptions of produce, such as butter, eggs, and so on, there would always be a market for them, although perhaps not at excessive prices.

### Manuring of Potatoes.

Mr. KRICHAUFF read the following paper:—

The present season has been disastrous for many persons who have rented land at high rates for growing potatoes. It may therefore be of some use to review results from using commercial manures in Australia and elsewhere. A potato crop is exhausting to the soil, as nearly all the plant-food is removed in the tubers. Liberal manuring is therefore absolutely necessary, and potash (as Professor Wright, of Glasgow, says) is by far the most important constituent in a potato manure. Of course, without a fair quantity of rain you cannot obtain a good crop, but with commercial fertilisers undoubtedly a better crop, perhaps even a paying one, may be secured. All the analyses made of Australian soils, compared with the soils of England and America, make it apparent that the former are very poor in potash, and they soon show signs of exhaustion if continuously cropped with sorghum, maize, potatoes, or even oats hay. But as Mr. Anderson, the late Director of Agriculture of New South Wales, says, "The supply of potash in Australian soils is generally from twice to five times as great as that of phosphoric acid," and the good results from manuring with superphosphate or Thomas phosphate so prominently set before our South Australian farmers by the pioneers with fertilisers are thus fully explained. By a rough calculation, at least 400,000 tons of potatoes are grown in Australia on, say, 80,000 acres. The average crop consumes per acre 192 lbs. of potash, and as kainit contains .24 per cent. of potash, and muriate of potash about 62 per cent., you can calculate the quantity of potash which should be used in Australia. A nitrogenous

manure, is, of course, necessary to get a full crop, but phosphoric acid and potash must not be omitted. Mr. Thompson, of the Hawkesbury Agricultural College, found only from forty to fifty-seven parts of potash in 100,000 parts in the light sandy and loamy soil of the college. Without manure potatoes yielded only 5 tons 16cwts. per acre; but on using 5cwts. of a mixture of two parts of kainit and one part of superphosphate, he had 8 tons 6cwts. As Mr. Thompson used to other crops 280lbs. of sulphate of ammonia per acre the land had probably received this nitrogenous manure. Where 150lbs. of nitrate of soda and 100lbs. of muriate of potash was used the crop was doubled. Others, and I myself on a small scale, have found that well-rotted stable dung alone, in so many cases used here, is not unfrequently unsatisfactory in the yield from an apparently luxuriant crop, and that artificial manures not only gave increased crops of tubers, but that by using kainit the potato grub (*Lita solanella*) did not make their appearance. Our experience in using commercial fertilisers for potato-growing is, however, so limited that I announce with much pleasure that the Stassfurt Potash and the German-Austrian Thomas Phosphate Unions have granted to me, for free distribution, the necessary muriate of potash, Thomas phosphate, and sulphate of ammonia, for having a number of experiments made with these substances on potato crops in South Australia. Persons who are willing to make them on five plots, each being 60ft. long and broad, or at the total length of 300ft. by 60ft., will please communicate with me, and I will select not less than four from their number. Similar experiments are this year also to be made in France at the expense of the Minister of Education, and I received a copy of the regulations. Sulphate of potash is there substituted for muriate of potash, and nitrate of soda for sulphate of ammonia. One plot also is to receive only stable dung, and another manured in part with stable dung supplemented by some nitrate of soda. If anybody here will extend his experiments to these also, I will give him the information as to quantities proposed in France. Most of the regulations insisted upon for French farmers might be followed here:—(1) To move the soil deep enough without bringing the subsoil to the surface; (2) to mix the stable dung well with the soil and the Thomas phosphate as soon as received (in autumn or winter); (3) to use the sulphate of potash in spring, and the nitrate of soda in two lots, one on putting out the sets, the other at the time of their appearance above the surface; (4) to use whole tubers of fair size; (5) to set them 18in. apart in all directions; (6) not to dig them before the leaves are quite dry. I have read also lately the results of experiments made by Dr. Munro, of Dowton Agricultural College, at Salisbury, in England, who at the request of the Permanent Nitrate Committee, of London (they are not vendors of nitrate, only desirous of giving every information), with the assistance of Mr. Beaven, the Hon. Secretary to the Warminster Technical Education Experimental Sub-Committee, carried them on during 1893, 1894, and 1895 on plots into which an acre was sub-divided and planted with the "Imperator" potato. The land was in good heart, but had received no farmyard dung for four years, and Dr. Munro applied nitrate of soda alone to give a supply of nitrogen. The rows of potatoes were 27in. apart and the sets 16in. in the rows. The sets averaged 3½ozs. During a season of extreme drought his plots had in 1893 no rain in the very middle of the growing season—that is in spring and early summer—but, strange to say, the potatoes did not appear to flag at all through that time. The increase in the crop over the unmanured plots was very marked, and showed also—as Dr. Munro remarks—that the phosphatic and potash manures applied were in this instance not required. Of course he did not intend to say that potash and phosphoric acid are not necessary. With nitrogenous manures alone, fertilisation is one-sided and a waste of money, unless sufficient potash and phosphoric acid is in the soil. As Dr. Neesler said, "Do not use repeatedly nitrate of soda without also applying the other necessary plant foods and sometimes lime." The potato plant would be all leaves on weak, lanky vines, which will stand drought badly and yield few and poor tubers. This has been my experience with nitrogenous manure alone. The report says:—As a dressing equivalent to the rate of 6cwts. per acre of mineral superphosphate and 4cwts. of kainit had been harrowed in five days before the planting of the potatoes on all plots receiving the nitrate, such application of kainit—generally considered all-important for potatoes—was undoubtedly much too late to have any effect. It should have been applied months before or to a previous crop; but the mineral superphosphate, although somewhat less important, would have acted, if of good quality, and sufficient rain had fallen to open it up as a plant food, it being soluble in water. Phosphoric acid in Thomas' phosphate being not soluble in water, but which the acid in the rootlets of the potatoes would have made available, might in this instance have acted better. As regards the results, we learn that nitrate of soda at the rate of 3cwts. per acre, if applied in two portions, did better than 4cwts. applied all at once after planting. The total crop from all plots, including the one unmanured crop, in 1893 was 21 tons 14cwts. per acre.

The ground was ploughed up all the winter for the crop of 1894, dragged and scarified about April 1, planted April 4, the crop hoed on May 20, and earthed up on June 1; the sets were 14in. apart in rows that were 27in. apart; the yield without manure was at the rate of 12 tons 2½cwts. per acre; where phosphate of potash at the rate of 2cwts. per acre alone was used on April 2 as a top dressing before planting—equal to 4cwts. of mineral superphosphate and 2½cwts. of kainit—11 tons 14cwts. were obtained, or less than from the plots without manure at all, showing that without nitrogenous manure no benefit was received except that

there were fewer diseased potatoes. But was this top dressing the best application of the mineral manure? With 2cwts. of phosphate of potash applied as before and 2cwts. of nitrate on April 5 the yield was at the rate of 14 tons 10½cwts. per acre. Where 2cwts. of phosphate of potash were applied as before with 4cwts of nitrate at one dressing on April 5 only at the rate of 13 tons 18½cwts. per acre were dug, heavy rain having washed down probably much of the nitrate beyond the reach of the roots. The same quantity of phosphate of potash, with a top dressing of 2cwts. of nitrate on April 5 and a second 2cwts. on June 1 before earthing up, yielded at the rate of 18 tons 1½cwts. Two hundredweights of phosphate of potash applied with 5cwts of nitrate in three dressings yielded at the rate of 21 tons 3cwts. per acre, and this in a bad potato year.

The early period for the growth of potatoes in 1895 was very dry. Two hundredweights of phosphate of potash was again given and 6cwts. of nitrate of soda divided into three dressings. It produced the best crop, viz., 20½ tons, calculated at per acre, against 4cwts. of nitrate in two dressings with the above 2cwts. of phosphate of potash, yielding at the rate of 19 tons 7cwts. per acre, and where 4cwts. of nitrate was given in one dressing at the rate of 19 tons 3cwts., while 3cwts. of nitrate so used yielded only 13 tons 7cwts. Dr. Munro had also a plot on which he used no phosphate and potash salts, only 3½cwts. of nitrate, which yielded 12 tons 10cwts. per acre, while another plot, with phosphate of potash alone, yielded only 9 tons 9cwts., or 1 ton 9cwts. above the unmanured plot.

Every year Dr. Munro had the potatoes sprayed with Bordeaux mixture against potato disease, and sometimes twice, to minimise the effects of the attack, even when there was no disease to speak of. He thinks that spraying prolongs the period of growth, and the haulms were quite green when cut down by frost. The technical committee's experimental plots showed in 1894 a gain of 5 tons 8cwts. per acre over unsprayed plots, and Dr. Munro's plot, which was only once sprayed, yielded at the rate of 2 tons 8½cwts. less than the rest of the plots, which received two sprayings.

Instead of nitrate of soda Mr. Chas. Hunter, of Cumberland, used 2cwts. of sulphate of ammonia with 2cwts. of muriate of potash and 4cwts. of superphosphate, which gave the best results; and he states again distinctly that the tubers are superior in their keeping quality to those raised on farmyard dung. Professor Paul Wagner gives the average increased weight of tubers obtained from the use of 1cwt. of nitrate as 1 ton 6cwts. per acre, while Dr. Munro claims it as 1 ton 16cwts. per acre over unmanured or "potash phosphate only" plots. Dr. Bernard Dyer gives the following as the method employed by a large and successful grower of potatoes viz.:—1½cwts. of nitrate of soda and 2½cwts. of mineral superphosphate per acre are sown in the drills or furrows, and the soil is then turned on to these manures with a drill plough, after which the ground is rolled, and the sets are planted over the fertilisers, with about 4in. intervening. A top dressing of 1cwt. of nitrate per acre is applied when the plants are getting well away. No less than 2cwts. of kainit must have been worked into the soil about six weeks before or to a previous crop. In America 700lbs. per acre of a fertiliser containing 7 per cent. of available phosphoric acid, 11 per cent. of potash, and 3 per cent. nitrogen is generally used. Some, however, use actually 2,000lbs. per acre, and obtain the best paying results; 800lbs. of kainit and 400lbs. of phosphate gave a clear gain of £8 per acre, according to Mr. Anderson. Experiments made at the Kentucky Station in 1895 show that plots not manured gave an average of 49·9bush. per acre; with muriate of potash alone, 67bush.; but where also nitrogen and phosphoric acid were provided the crop was 127bush. per acre. Another experiment made at Shaker Station, Connecticut, gave 73bush. per acre from a plot which received no fertiliser; 140bush. where phosphoric acid and nitrate of soda was used; and 239bush. per acre where to these 240lbs. of muriate of potash was added. Another advantage was that comparatively few tubers were small and unmarketable.

All these experiments show that the presence or absence of potash will determine to a considerable degree the yield of potatoes, the percentage of large tubers and their soundness and keeping quality; but it is a question for South Australians whether they should use kainit or muriate of potash, both of which contain much chlorine. Our rains are not always sufficient to wash this into the subsoil or the drainage. We may have to prefer sulphate of potash or sulphate of potash and magnesia, which contain hardly any chlorine, and produce the finest starchy potatoes. For heavier soils it appears that the yield is in every instance larger with sulphate of potash, probably because the chlorine of kainit and muriate will not be so easily leached out as in lighter soils, where muriate of potash is more frequently used. Potato farmers have, therefore, important questions to solve, if they will go in for experiments, as I hope they will do. No doubt there is money in successful potato-growing.

### Personal Observations.

Mr. WHELAN read a paper on "Personal Observations on Husbandry," in which he referred more especially to the successful results obtained in this district by use of seed drills and fertilisers. It was a marked lesson to see, on so-called exhausted land, drill and manured crops going 12bush. per acre in



such a season as the past, while the broadcasted land adjoining was giving only 6bush. He thought there was no other district in the colony where the drill would be of so great use, as after three or four crops their land gets wheatsick and no length of spelling or fallowing brings it back to anything like fertility. Fallowing is successful in other parts, the North especially, but is a failure here owing to takeall. Professor Lowrie may perhaps be able to tell us whether this is due to too early or too late working of the soil. They also had a large area of heavy "crab-hole" clay land, very difficult to work when wet, and he doubted whether the drill could be used here, and whether the fertilisers would give the same result as on the light loamy soil. In the part of Ireland from whence he came they used heavy dressings of lime on such soils with marked benefit, and, as they had good limestone and plenty of wood close handy here, it should pay to give the land similar treatment. Then seaweed was also much valued in Ireland. Surely this would also pay here. There were thousands of tons rotting on the beach at Kingston, and it should not be a difficult matter to get the Railway Department to carry this at low rates. There was no doubt that the first expense prevented many farmers from using fertilisers. To obtain the fullest benefit from the fertilisers thorough cultivation was necessary. The land should be ploughed deep and, if practicable, subsoiled.

Mr MOLINEUX said that many years since he had written pointing out that there was a mine of wealth in the seaweed at Kingston. If they could get it brought there at a reasonable figure they should do so. An Act had been passed providing that every person selling manufactured fertilisers should give an analysis of what it contained, and if it did not contain what was stated the seller was liable. Everyone buying manure should obtain an analysis, as it had been proved that people had purchased inferior manures. Kainit had been applied to some soils with disastrous effects, as it had too much salt in it.

Dr. OCKLEY thought that farmers required to have some knowledge of chemistry, and then they would be in a position to know which fertilisers to apply to the different soils. He thought it would be a good thing if classes for instructing young men in chemistry were formed in connection with institutes. It would be too much to ask the staff of the Agricultural College to go about giving lectures, but all medical men had a knowledge of chemistry, and their services might be obtained for giving lectures. It was a thing he would like to see carried out.

Mr. KRICHAUFF said a publication had been issued in Canada dealing with agricultural pursuits generally for the use of public schools, and he would like to see the part of it dealing with chemistry reprinted and distributed here, so that persons who wished to be instructed in chemistry could have it by them. There was to be a secondary agricultural school formed in the South-East, which would be a good thing, for we wanted practical as well a theoretical teaching. Most of the potatoes produced in the Channel Islands were manured with seaweed.

Professor LOWRIE recommended that quicklime be applied to the stiff soils in the Tatiara district, in quantities of about 2 tons to the acre, and if they used a phosphatic dressing with it the fields would benefit. Referring to seaweed, he thought the freight would be too heavy for financial success, the distance being so great—100 miles.

Mr. UMPHERSTON thought that the Government should appoint a chemist to analyse manures. Stable manure was often nothing more than chaff. He believed that lime was necessary for the soils in the Tatiara, but it was no use putting lime on the land if they did not keep it dry, and he was of opinion that the farmers at Wolseley should drain off the surplus water. He thought the seaweed was a good manure; it had been successfully used at Port Mac-Donnell.

Mr. MOLINEUX thought Professor Lowrie was not aware of the nature of the seaweed at Kingston. He remembered seeing a bank of seaweed there that could be cut out in blocks. He believed it was a sea grass washed on the beach from long shallows or flats.

### Next Conference.

Dr. OCKLEY proposed that the Conference next year should be held at Naracoorte.

Mr. SMITH, on behalf of the Naracoorte Branch, undertook to have all possible done to make the Conference a success if held there.

Mr. MOLINEUX said the members should bear in mind that these meetings were Conferences of Branches, and not of a few delegates from each Branch. In order to get the fullest benefit every member of the Branches interested should make an effort to attend.

The motion that the next Conference be held at Naracoorte was carried.

### Feeding of Stock.

Mr. T. H. WILLIAMS (Stock Inspector) regretted there was not time to have a discussion on the feeding of stock. There was no doubt some of the cattle he had seen that day near the railway lines would benefit by molasses being added to the straw, and he strongly recommended stockowners to try it. He thought mixing the molasses with the feed just before giving it to the stock was preferable to adding it to the straw when stacking.

Dr. OCKLEY said copra cake would be found just as beneficial as molasses for this purpose.

### Stock Complaints.

During the interval for tea Mr. Williams, by means of his microscope, showed slides of the bacilli of tuberculosis, anthrax, actinomycosis, cancer, and other diseases of stock to an interested audience.

### EVENING SESSION.

Professor LOWRIE said he had had two questions handed to him for reply. The first was regarding the best wheat for hay, the quantity of seed to sow, and whether it should be pickled. He advised them to grow the wheat which did best in the district; bearded wheats he would strongly recommend. The bearded wheat would not injure the horse's mouth if ordinary attention was given. The drier the district the thinner should the sowing be, as a general rule. He would sow 2 bush. to 2½ bush. of oats per acre. In reply to inquiry as to best grass to sow for permanent pasture in this district, he said the natural grasses well handled would, he believed, give best results. Change of stock was beneficial to the pastures.

The Professor then gave an address on "Wheat Diseases and their Remedies," with blackboard illustrations, of which the following is the substance:—

There were many diseases of wheat, but he confined his attention to stinking smut, properly called "bunt," and the loose smut. He first spoke of bunt, a disease which the district suffered from this year. An experienced eye soon detected a bunted crop by its straight standing and bluish color, and if the ears were examined it would be found that the grains, instead of being filled with flour, were filled with a black powder inside the shell. The black powder consisted of the seeds of the fungus. They could understand, then, how a few of those grains passing through the reaper or thrasher or winnower might be the means of infecting the greater part of a crop. But that disease was under the control of the farmer, and if they had bunted crops it was because they had been careless or had been a trifle outwitted. If they treated their seed with some antiseptic—something that would kill the fungus or its mycelium—they would have no danger, and if their land had been fallowed and had not been immediately manured with farmyard manure they could trust the spores were not in

the soil. Bunt was sown at harvest time with the seed, and was not the result of "the evil eye" of a witch, as was the old idea. Nor was it the influence of the moon, another notion. The Professor very interestingly described, with the assistance of a black board, the life history of bunt. The spores germinated in two or three hours, and the powers of reproduction of the fungus were wonderful. In some cases it might outwit the farmer, who might think he sowed clean wheat and yet have a bunt crop; yet in the next harvest the seed might be sown on the land dry, but the moisture in the soil at the time of sowing might be sufficient to germinate the spores of the fungus, and not sufficient to germinate the seed wheat. The fungus under the circumstances, finding no host—no wheat plant—to live on, might die, and afterwards the crop come, and there would be no bunt in it; yet if the moisture in the soil were enough to germinate the seed wheat and the spores at the same time, the fungus would live on the wheat and destroy the crop. Thus farmers might be deceived, and not see the need of pickling. Various remedies had been tried; none would be efficient that did not kill all the spores on the sound grain as well as those in the unbroken balls of smut. Bluestone, he thought, had been, on the whole, the most successful and popular, but it required careful handling or they would kill the wheat as well as the spores. Another treatment was sulphate of soda (8lbs. to 10galls and dried by lime) after being treated with which the wheat was dried with lime. Steeping in brine, and washing it off with persistent washing was another. Then hot water was recommended by many; and some had good results, while others did not think they had such good results as with bluestone. The bluestone would be found efficient if they took a  $\frac{1}{2}$  per cent. solution and let the wheat steep in it from twelve to sixteen hours. He thought that probably a better solution was to use 1lb. of bluestone to 10galls. or 12galls. of water, making a slightly under 1 per cent. solution. Even that would kill some of the wheat. They could apply the solution in any way they liked—by dipping the bags of wheat in tubs of it, and then spreading the wheat on the floor to dry. Others made up the mixture, spread out the wheat on the floor, applied the mixture, and turned the wheat over several times. He liked that plan. A good plan to dry the wheat was to use finely-powdered lime. The worst of that was it ran very badly through the drill. The sulphate of soda practice was to use 13ozs., or near about that, of sulphate of soda to 1gall. of water, and soak the wheat in it. The seed was dried with lime in the way already described. Thus, if farmers had bunt in their crops they had only themselves to blame. Loose smut would affect barley and rye grass as well as wheat, and was in a different form on each. He described the life history of the fungus, and said this fungus was much more vigorous than the other, and often ate up the grain, chaff, and even part of the stalk. It was also very difficult to get rid of, and would live longer in the land than bunt. It might blow about as dust, and fall on the young grain just as it was fertilised, and when the wheat grew it might be covered in by the growing grain, and become therefore the more difficult to deal with by the application of bluestone or anything else. Then they would find that they would not have the success they expected, as they could not get the antiseptic solution into the spores that were inside the grain cover. It had been found that the hot water treatment was better for the smut in barley and oats and the loose smut in wheat. Steep the grain in water heated to 135° for five minutes. It was best to put it in for a few seconds and then remove it, and put it back again, and so on; and in fifteen minutes the grain was softened a great deal and the spores inside the skin would be destroyed.

A short discussion followed.

Mr. WHELAN asked if the Professor could give a reason for the failure of following on the Tatiara lands.

Professor LOWRIE said he believed the reason was that the land was ploughed too dry, and gave an illustration from his own experience. On land that he worked when wet he had no takeall, and where he ploughed the land very dry and put in the wheat he had takeall. He explained in detail the reason for this, and advised them to plough the land when it was in good ploughing condition, and they would not then have any takeall. Other speakers gave their experience, which seemed to bear out the Professor's statement.

### Manuring and Seed Drills.

Mr. G. MILNE read the following paper:—

The subject under discussion is one of vital importance to all cultivators. In common with other districts we have arrived at that period when, if successful cultivation of cereals is to be carried on, methods of cultivation must change. The quantity of virgin soil available is yearly decreasing, and the old cultivation paddocks are in such a condition that they will not yield payable crops under prevailing treatment. I know of one case where 240 acres yielded sixty bags, equal to 1bush. per acre, and other returns have been equally poor. Now, if we cannot do a great deal better than this we must either give up cultivation or become insolvent.

For some years our farmers have been anxiously looking out for some reliable fertiliser at a moderate price. Although very valuable in many ways, farmyard manure is out of the question, for in our dry district we cannot secure enough to cover one-tenth of the land we want to cultivate, to say nothing of the heavy expense of applying such manure.

I think Messrs. Cudmore and Correll, of Minlaton, Yorke's Peninsula, were the first farmers to call public attention to the success they had in using such manures as Thomas phosphate, bone phosphate, superphosphate, and guano (the active principle of all being phosphoric acid) drilled in with the combined seed and manure drill. By the application of from 4s. to 8s. worth of either of these fertilisers per acre crops were increased from 8bush. to 12bush. As a general rule farmers do not experiment enough. We like to see someone else take the risk, when, if a good thing turns up, we are ready enough to follow on and secure a share of the profits; but it must be very plain that there will be a profit or we fight shy of it. In this case, however, success was so marked that many followed the new system in almost every case with profit. Some local farmers, notably Mr. Prescott, have been experimenting for some years with these manures, and the results convinced us that it would pay on a larger scale.

Last May Messrs. Norman & Co. sent a man to this district in charge of a seed drill, with instructions to sow a small area on any farm where desired at cost price. The chance was availed of by Messrs. Scown, Prescott, Fisher, Montague, and Whelan, members of the Tatiara Branch, and three others. Out of these nine trials, on different soils, there is not one that has not returned payable results, notwithstanding the very dry season we have had. I think it will interest you to hear of some experiments made by my brothers and myself on our farm. Last season we purchased a drill, and  $2\frac{1}{2}$  tons Thomas phosphate,  $2\frac{1}{2}$  tons bone phosphate, and  $\frac{3}{4}$  ton K I. guano. We have a paddock of 100 acres, which has been cropped continuously for years, in a way which I am afraid Professor Lowrie would not approve, and which paddock we looked upon as quite worn out. This being the case it formed a good base for experiments with fertilisers. We finished our other seedling before starting with the drill, having sown 420 acres broadcast. We commenced ploughing this field on June 15th, and the next day I followed with the drill and sowed six plots as under:—

No. 1.	Five acres, 42lbs. seed,	56lbs. Thomas phosphate;	yield, 10bush.
No. 2.	" 52lbs. "	65lbs. "	12bush.
No. 3.	" 52lbs. "	80lbs. "	17bush.
No. 4.	" 52lbs. "	100lbs. "	16bush.
No. 5.	" 52lbs. "	130lbs. "	—
No. 6.	One acre 60lbs. "	no manure broadcast	—

Many practical farmers inspected these plots during growth, the universal opinion being that great improvement was shown up to 80lbs. per acre, but none after that, and that the average of all the manured plots was quite double that of the unmanured. This was borne out at harvest time. Another experiment was:—

One width of drill, twenty-three chains long, of each of the following:—

No. 1.	60lbs. seed, 120lbs. bone phosphate;	yield, 38 sheaves of hay
No. 2.	60lbs. " no manure	" 15 "
No. 3.	60lbs. " 150lbs. bone phosphate	" 42 "

The appearance of these strips was sufficient to show that the improvement was the result of the fertiliser, not drilling the seed. Seventy acres in all were drilled with wheat, the return being fifty acres for hay, 1 ton per acre; twenty acres for wheat, 14bush. per acre.

The remaining thirty acres was drilled with oats. I had many experimental strips, but the rush of harvest work prevented me from keeping them separate at harvest time, but the application of either of the fertilisers I have named never failed to double the crop when applied at the rate of 80lbs. or over. The 1896 crop was sown broadcast in May, and returned 6bush. per acre. The 1897 crop was drilled in the last week in June with an average of 100lbs. of manure, and returned 16bush. I am convinced from the appearance of the strips left without manure that the 1897 crop would not have exceeded 7bush. or 8bush. if put in the old way. To show the treatment this thirty acres had received I will give you the years of cultivation and the crop. It was broken up in 1889 and cropped each year since, except 1893, the yields in the successive years being 3bush. wheat, rusty; 13bush. wheat; 15cwt. wheaten hay; 22bush. Algerian oats; fallow; 9bush. wheat; 12bush. oats; 6bush. oats; 16bush. oats. I feel satisfied that the drill and fertilisers have come into our district to stay, and I look mainly to their influence, combined with better cultivation, to give us return, something more like the old ones we talk about than those we have experienced of late years.

### The Use of Fertilisers.

Mr. E. PRESCOTT then read the following paper:—

My experience with commercial fertilisers extends over a period of seven years, having broadcasted the manure on small plots each year up to 1896, and I have found them distinctly beneficial to the crops, especially to wheat and barley.

Four years ago I sowed superphosphate at the rate of 1cwt. per acre across a land in a crop of oats sown for green feed, and got fully double the yield off the portion so treated. This land has been cropped each year since, and even last year the place where the super was applied was distinctly better than the rest, showing plainly that the beneficial effect of the super extends over several years. Three years ago I put 1cwt. super on an acre of land cropped with maize, and got a good return. The following year this land was sown with Medea wheat for green feed, another hundredweight of super being applied, and a very heavy crop resulted. To test the yield a quarter of an acre was left for hay, from which a little over a ton of chaffed hay was taken, showing a return of 4 tons of hay per acre. Last year this same land was sown to Algerian oats, without manure; result, 30bush. per acre.

Two seasons ago I tried the manures on a larger scale, put in thirty acres with Algerian oats and applying 1cwt. Chemical Works' super per acre, the seed and manure being harrowed in. One land was left unmanured, and when the crop came up it was very thin here, but thick and strong on the rest. The manured portion looked much better right through until coming into ear, when it began to suffer from want of moisture, the season being very dry, notwithstanding which it yielded at rate of 11bush. per acre, cut with binder, which did good work, and left me with 6 tons of good oaten straw. The unmanured land only yielded 4bush. per acre. The same season a field, twenty-six acres, of very poor land sown with purple straw wheat, one land was top-dressed in September with Kangaroo Island guano at rate of 1½cwt. per acre, one land being manured at rate of 3cwts. per acre. Very little rain fell after applying the guano, and the effect on the crop was not noticeable, the yield being only 4bush. Last season on the same land I had two acres drilled in with 45lbs. Cape barley and 1cwt. fertiliser, six acres with 4½lbs. white Tuscan wheat and 1cwt. fertiliser, and eighteen acres with 35lbs. Algerian oats and 1cwt. of fertiliser. The whole crop came on very well until the oats and wheat were in ear when they were badly blighted by hot winds, but the crop continued to grow, especially the barley. The heads of wheat were badly blighted right through the crop, the oats showing only in a few patches. Where the heavier dressing of guano was applied the previous year all three varieties looked 25 per cent. better than on the rest of the land, showing that the previous dressing with guano largely contributed to the result, which was very satisfactory. Cape barley yielded 30bush. per acre, wheat part 2 tons hay, and rest 14½bush. per acre, oats 22bush. In another field of eighteen acres, good land, I sowed same quantity of oats and fertiliser, and got a return of 18bush. per acre, and account for the lower yield by the fact of it not having been treated the previous season to guano. I have used English super, Thomas phosphate, Reliance bonedust, Colonial Sugar Co.'s phosphates, grades C, B, and A, and place them in the above order according to their merit.

The result of drilling in the manure with the seed is much more satisfactory than broadcasting, and I have no hesitation in advising the general use of the seed drill and fertilisers, believing that the crops will yield double what we have been getting under the old system. The crop is more even, has more flag, and the straw is taller, making it possible for the binder to do good work. With a poor crop and short straw the binder will cause the loss of a lot of grain, but on the drilled crop there is little loss; in fact I never cut crops with so little waste of grain, although my binder has been in use for eight years. By using the binder and heading the sheaves we obtain a good stack of straw of fair feeding value, especially when grass is short. If a well-thatched stack of straw is carried over each year we would not have our stock starve in bad seasons.

In conclusion, I would state that I do not intend to crop any old land in the future without using the drill and fertilisers, and I feel assured that the day is not far distant when this practice will be universal throughout the colony.

Some discussion ensued on the relative values of the different methods of using the manure, i.e., drilling in with the seed, mixing the seed and manure together before sowing, and broadcasting, the first finding most favor.

Professor LOWRIE said he was very much pleased with the papers that had been read by Messrs. Prescott and Milne, and wondered at the results. They were better than he could get on the land he was working. He was sure that the money spent on the College had been to a considerable extent recouped by the improvement of farming by means of manuring in South Australia. He was using, in order to get the best results, 150lbs. to 200lbs. of superphosphate per acre. He had this year the best results with 2cwts. of superphosphate per acre. By mistake in one case 4cwts. of Thomas phosphate was put on five acres, and he got 18bush. per acre. Where the 2cwts. had been put on he got 16bush., and got practically the same thing on unmanured land alongside. This year's results were not so marked as those he had had in past years. If the Tatiara farmers could obtain good results with 80lbs. per acre it certainly strengthened the practice of manuring in a very great degree. He thought they would find

it better if manure were applied less frequently, and more of it applied at a time. To get the best results he believed they would have to work the fallow in the winter preceding, so as to get the one year's moisture to help it in the year in which they expected the results. He did not think even the rainfall of 22in. was sufficient to give full fruition from a top dressing of manure in the first year. Mr. Umpherston had spoken of the advantage of growing other crops as well as grain, and he admitted that a large crop of onions was a very profitable one. Farming, if it meant anything, meant the application of brains for developing as quickly as possible what they could get the best results from. If they could have more thoughtful, active, business farming South Australia's results would be more than doubled. Instead of an average of 3bush. or 4bush. of wheat for the colony they might have 11bush.

### Saltbushes.

Dr. MURRAY GIBBES tabled sample of saltbush grown at Millicent, and asked Professor Lowrie whether it would be likely to grow in the Desert, and if so would it be worth trying.

Professor LOWRIE said that nature had defined the country where the saltbush would best grow before anything else. He did not think the return to be obtained from growing the saltbush in the Desert would justify growing it there.

Mr. MCKAY did not agree with Professor Lowrie on that point, and thought it could be grown successfully in other than its native soil.

Mr. KRICHAUFF said that the saltbush might do in the Desert; they could not say till it was tried. It had grown well in the Cape and California, where it had been planted on a large scale.

Mr. MOLINEUX said he had seen saltbush growing luxuriantly on the Wagga Wagga Experimental Farm, where it was not a natural growth. It would not pay to grow saltbush on land which was rich enough to grow better feed and products.

### Votes of Thanks.

A hearty vote of thanks was accorded to the ladies of Bordertown for providing the visitors with luncheon and tea, and votes of thanks to the exhibitors and to the members of the Central Bureau closed the meeting.

### FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

March 31, 1898.

The looked-for March rains have not fallen, and instead, an unusually hot month for time of year has been experienced. The unprecedentedly long, dry summer shows no sign yet of breaking-up, and even should rain soon fall, with the near approach of the cold season we can hardly now expect to have much winter feed. The vintage (just completed) has yielded only about half crop; but, as vignerons point out, the fact of this being the first failure in something like forty years' experience establishes the suitability of South Australia for vine-growing.

In breadstuffs the trade has experienced a dragging month. Wheat quotations are nominally as when we last reported, but, in consequence of lower rates prevailing in Victoria and New South Wales, the market here at moment is very slow. Farmers continue to hold firmly, but dealers all seemed inclined to quit stocks. The Chamber of Commerce fixed the f.a.q. bushel this season at 62lbs.—unusually light for our colony's wheat; still considerable quantities of grain, especially from the coastal districts, fail to reach the standard, so that, in spite of the dulness, good samples can find buyers. Flour has eased about 5s. per ton. Offal lines, however, well maintain, pollard even commanding 1d. advance. Feeding grains are unaltered, but chaff is decidedly weaker.

Rain now could not help even the late potato crops, so that for the next four or five months this colony will have to rely upon importations for probably half its requirements. The local sample varies considerably, not averaging up to usual quality. Importations are coming from Tasmania and New South Wales, and those colonies must, until next season, control values

here. Onions have fluctuated slightly, and an advance in this line is prevented by the large proportion of local supplies reaching market in bad keeping condition, therefore necessitating immediate disposal. The crops in the Mount Gambier district, however, are reported to be good and coming on well.

Activity has characterised business in dairy produce lines. With the stoppage of shipments to Europe from the eastern colonies consignments of butter were diverted to this market so that prices here gave way about 2d. per lb. An improvement in New South Wales and New Zealand occurred, however, which checked the downward trend, and Adelaide is now relatively on a par with intercolonial rates. Owing to the continuance of the drought there is now no doubt that this colony will have to rely upon importations for a considerable proportion of its requirements. For several months past eggs have had very active business, but at moment are weaker. With the advent of cold weather soon to be expected, however, with its shortened supplies, we look for an early advance again. Honey has continued more plentiful, but prices have improved. Brisk sale for beeswax. A heavy month's business has been done in cheese, with stocks for time of year very small, and values show improving tendency. Bacon is somewhat easier owing to the raw material being more plentiful, but trade in this line also has been brisk, and curers' stocks are light. Hams in excellent demand. Almonds—Kernels are very saleable, best soft shells also are in request, but mixed and inferior kinds dull.

Poultry is much more plentiful and prices have eased considerably, but at present rates there is a strong demand for good birds, poor and small fowls being neglected.

#### MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, 4s. 4d. to 4s. 4½d. per bushel 60lbs.  
 Flour.—Per ton 2,000lbs., £10 10s. to £10 15s.  
 Bran.—1s. ; Pollard, 1s. 2d. per bushel of 20lbs.  
 Oats.—Local Algerian and dun, 2s. 3d. to 2s. 6d. ; good stout white feed, 3s. per bushel of 40lbs.  
 Barley.—Malting, 3s. 9d. to 4s. 6d. ; feeding sorts, 2s. 9d. to 3s. 3d. per bushel of 50lbs.  
 Malt.—Local, 8s. to 9s. per bushel of 40lbs.  
 Chaff.—£3 10s. to £3 17s. 6d. per ton of 2,240lbs. ; f.o.b., Port Adelaide, dumped.  
 Potatoes.—Mount Gambier, £7 12s. 6d. ; Tasmanian, £8 to £8 5s. per 2,240lbs.  
 Onions.—£5 to £5 10s. per 2,240lbs.  
 Butter.—Creamery and factory prints, 1s. 4d. to 1s. 7d. ; dairy and collectors' lines, 10½d. to 1s. 2d. per lb.  
 Cheese.—S.A. Factory, large to loaf, 8d. to 9d.  
 Bacon.—Factory cured sides, 8½d. to 9½d. ; farm lots, 8d. to 9d. per lb.  
 Hams.—S.A. Factory, 9½d. to 11d. per lb.  
 Eggs.—Loose, 1s. ; in casks, f.o.b., 1s. 2d. per doz.  
 Lard.—In bladders, 7d. to 7½d. ; tins, 6½d. to 6¾d. per lb.  
 Honey.—4d. for best extracted, in 60-lb. tins ; Beeswax, 1s. 2d. per lb.  
 Almonds.—Soft shells, 3d. ; kernels, 6d. per lb.  
 Gum.—Best clear wattle, 2d. per lb.

#### WEATHER AND CROP REPORTS.

AMYTON.—The weather during the past month has been very dry, but comparatively cool and pleasant. Seeding has become general ; several farmers are nearly finished. Feed in some cases is getting scarce, but stock are still in fair condition. All are anxiously looking for a good general rain.

ANGASTON.—The season has been very trying, in consequence of which there has been a great falling off in the vintage and in the apple crop, which is only about half last season's crop. Stock are in good condition and feed is plentiful. Dams, creeks, and natural springs have never been so low as now.

BOWHILL.—The rain has started the grass, which is growing fast, but unless we have rain again very soon it will go off. Where the land is clean ploughing has been commenced, but in most cases farmers are waiting for the rubbish to get a good start.

CALCA.—The weather has been most trying during the month, extreme heat or boisterous winds prevailing nearly all the time.

CARRIETON.—Seeding operations are becoming general, and there will be a large area in by the end of March. Rainfall during February was very patchy. Carrieton, 0.450in. ; Yanyarrie, 1.010in. ; Minburra, nearly 3in. — filling all dams on a limited area of country. Stock are keeping in good condition, principally on the annual saltbush. March has been dry, with cool nights. Rain is anxiously looked for to start the grass before the cold comes on, as owing to the elevation of the district, 1,500ft. above sea level, frosts are severe.

KANMANTOO.—Since last report we have had a good fall of rain, about 1½in., which has replenished the tanks and made the grass shoot. Unless we have a further fall soon the grass will shrivel.

**KAPUNDA.**—Livestock are in good condition, and feed is plentiful. Rainfall for February, 1·890in., and with good fall early in March. The grass has started, but is going off owing to heat. There is more hay and straw stacked within ten miles of Kapunda than ever before in any one season.

**LUCINDALE.**—Since last report nice rains have fallen, about 1·270in. This has given the grass a start, and, with mild weather and dewy nights, has assured the early feed in some parts. More rain is eagerly looked for to start the feed on the flats. Early green feed is already above ground, and some farmers have started ploughing.

**MOUNT BRYAN EAST.**—Since previous report there has been a decided change for the better, about 2in. of rain falling during last week of February, filling most of the tanks and dams and starting the feed. Calm days and dewy nights have been experienced since, but more rain is required to keep things going.

**MOUNT COMPASS.**—Light showers and heavy dews have been experienced during the month. The onion crop is turning out very light. Stock in fair condition.

**MOUNT GAMBLER.**—There has been enough rain this month to start the grass, but not sufficient to keep it going or to benefit the late potato crops, which have suffered severely. The crops of potatoes have varied from almost nothing to 3 tons per acre in a few cases. Onions have done better, up to 5 tons and 6 tons, and of good quality. Apple crop very poor. There are a good many cases of impaction and inflammation of the kidneys amongst cattle, caused by dry coarse food and bad water, respectively. Sheep are particularly healthy, there being almost entire absence of parasitic worms, which have caused so much trouble of late years.

**MOUNT PLEASANT.**—Stock look fairly well, but are falling off in condition since the rain. Rainfall for February 2·50in. Wheat crops averaged about 11bush. grain of good quality.

**MURRAY BRIDGE.**—The weather has been cool and pleasant, and not sufficiently hot during March for burning scrub properly. Rainfall about 0·750in., but water-carting is becoming general again on the back farms. The swamps have been a source of profit to their owners, sheep and large stock fattening well on the feed which grows there in dry season. Stock are generally in fair condition, and the plentiful supply of hay on the farms shows that the farmers have learnt something from the effects of the drought.

**MYLOR.**—Owing to the good rain early in the month planting operations have been pushed on vigorously. Potato crops put in in January are looking very well in some cases and poor in others. Owing to dry weather they will be late. Rain is much needed.

**NANTAWARRA.**—Rainfall for February, 0·060in. Stock in fairly good condition, but feed beginning to run short.

**ONETREE HILL.**—The hay crop yielded a ton to the acre; most of it is still in the stacks. The vintage is finished and, considering season, the return is fairly satisfactory. Maize and sorghum crops are light, but have exceeded expectations. Stock in fair order, but have lost condition since the rain. Rainfall in January, 0·020in.; February, 0·930in.; March, 0·400in. Easterly the fall was much heavier, up to 2in. being recorded.

**REDHILL.**—The rainfall about end of previous month was very patchy, being heavy enough in places to start the grass and fill the dams, but very light only short distance away. Ploughing for present crop and for fallow has started, six-furrow ploughs being tried by some with satisfactory results. A few farmers have commenced sowing, but others are waiting for rain.

**SADDLEWORTH.**—The rain at the end of February replenished the tanks and dams, but destroyed the good quality of the dry feed, and appeared of little benefit to the sorghum, which this year is of poor quality. Several trials of fertiliser drills and ploughs have been held. Rainfall for February, 2·18 in.; March, 0·250in.

**SPOCKPORT.**—Farmers are busy preparing for seeding, and manures are being resorted to extensively, as their value in this district has been proved most conclusively. Rainfall for March, nil; weather warm and fine.

**YORKE TOWN.**—The weather keeps very dry, but is cool and cloudy at night.

**VALUE OF BONES.**—Omitting fractions, 100lbs. fresh bones would contain about 4lbs. nitrogen, valued at 1s. 8d., and 20lbs. phosphoric acid, value 2s. 6d. —total, 4s. 2d. Very old bleached bones would contain no more than 2lbs. nitrogen, value 10d., and 16lbs. phosphoric acid, value 1s. 8d. If bones are burned the nitrogen is lost, and the value is reduced to that extent. If bones are broken into small pieces and mixed with fresh stable manure they will become soft and pasty. If pulverised gypsum is sprinkled liberally over the fermenting mass nearly every ounce of the ammonia or nitrogen will be saved in the manure, and its value may be further increased by adding fresh wood ashes to any extent.



## CENTRAL AGRICULTURAL BUREAU.

MONDAY, MARCH 14, 1898.

Present—Messrs. F. E. H. W. Krichauff (Chairman), W. C. Grasby, Thomas Hardy, J. Miller, M.P., T. Price, M.P., T. B. Robson, and A. Molineux (Secretary).

### Finance.

The SECRETARY reported that the Acting Minister of Agriculture had approved of an excess warrant for £40 to meet the March expenses of the Bureau.

The Finance Committee reported expenditure to date for contingencies, £710 6s. 11d.; balance, £49 3s. 1d. Accounts to the amount of £45 4s. 1d. were passed for payment.

### The Beet Sugar Factory at Maffra, Gippsland, Victoria.

Mr. THOMAS HARDY read the following notes on this subject:—

I had the pleasure of being shown over this factory, now nearing completion, by the chairman of directors, the Hon. A. McLean, on the 7th February. The subscribed capital of the company is something over £23,000, and the Government have advanced twice the amount of capital subscribed by the shareholders. The machinery is of the newest pattern, and was made at Brunswick in Germany, and, with some ironwork in the building, cost £33,000, with another £6,000 for freight by ship and rail.

The whole of the machinery is being put up by men sent out by the manufacturers, who have to run the factory for six weeks. It is capable of treating 350 tons of beet per day. The steam power consists of five immense tubular boilers with superheating boilers to each.

The beets are washed and cut into thin slices by machinery, and the sugar extracted in closed vessels with warm water; the residue, after being pressed, is good food for cattle. There are about 1,700 acres of beet growing in the immediate neighborhood; some locally-grown beets have been found to give 18 per cent. of sugar, which is higher than is got in any other country. As much as 40 tons per acre was grown in trial plots last year, but owing to the dry season experienced they expect barely one-half of that this year. The price to be paid to growers will be about 16s. per ton delivered at the factory. The company had to put in some 500 acres to give it a start. The country around appears to be well adapted for the plant, and in ordinary seasons the rainfall quite sufficient. The beets are all drilled about 15in. apart between the rows and thinned out to about 9in. from plant to plant. The sowing was continued as late as November, but the later sowings are a failure owing to the dry season. It is a pity that they have not a full crop to start upon.

The building is all of brick, and some parts of it five stories in height.

I was informed that the starting of this great enterprise, which if successful will benefit the whole district, is due to the untiring exertions of Mr. McLean.

As far as I could learn, the only complaint amongst those growing beet for the factory was that the price offered would not allow of the engagement of labor at ordinary rates for the cultivation, especially the thinning out and singling of the crop. Where the work could be done by the family of the grower the price offered would leave the grower a fair profit, but if adult labor had to be engaged there would be a loss. Owing to the price at which Queensland and foreign sugars were offered in Melbourne the factory could not offer a higher price than that mentioned.

The CHAIRMAN said he was very pleased to hear Mr. Hardy's remarks. There was no reason why sugar beets should not be profitably grown in the South-East. The climate and soil was most suitable, and they could reasonably expect as good quality beets as grown at Maffra.

The SECRETARY pointed out that enormous quantities of fuel and water were required for a beet sugar factory, and while these were readily and cheaply obtainable in Gippsland, there would be some trouble to supply fuel at cheap enough rates in the South-East.

### Wheat Experiments at Mount Templeton.

The CHAIRMAN reported having received an interesting report from Mr. C. N. Grenfell, of Mount Templeton public school, on the results of experiments

with cereals carried out by himself and his pupils during the year 1897. These experiments were carried out in a very thorough manner, and were most instructive. The following is a short digest of his report.

He has two tables showing the yields of wheat, of which twenty-five kinds were sown before rain and thirty kinds after. Twenty-four kinds were sown during the first week in May, and "Newman's" on the 12th. King's Jubilee ripened on November 3, Early Para and Steinwedel on November 12, and the rest of the first sown varieties during the third week in November. Wheat sown between June 12 and 14, after rain, which fell mainly in last week of May, in some cases ripened at same time as those sown in first week of May, in other cases a week later.

A single season's experience is not sufficient to allow of any conclusion being arrived at as to whether or not it is best to sow after rain.

Newman and Steinwedel, sown after rain, ripened on November 10, twelve and seventeen days respectively before the same varieties sown before rain.

Another table shows that during four years African Baart always gave the best crop; in fact in 1893, when manured with refuse from a wood pile, it gave 48bush., while Velvet Pearl with the same manure gave 26bush. Stable manure used direct for other sorts of wheat blighted the crop as usual. In table D the difference in the yield when using plump and shrivelled seed is very marked. In Steinwedel it was 12bush. 14lbs. and 10bush. 5lbs.; in Purple Straw, 11bush. 47lbs. and 6bush. 5lbs.; in Cowan's Purple Straw, 19bush. 15lbs. and 11bush. 12lbs.; and in African Baart, 17bush. 41lbs. and 13bush. 28lbs. The germinating power of the latter was 94 for plump and 78 for shrivelled grain. Table E showed that all the grains at a depth of  $\frac{1}{2}$  in germinated, at 3in. 90 per cent., at 6in. only 23.1 per cent. One of these last was dug up after ripening its grain, and showed three successive layers of adventitious roots, the last main crown  $\frac{1}{2}$  in. from the surface. Table F showed that a clean sample of wheat produced no bunt and the best crop, while the same mixed with bunt spores had, if pickled, hardly any, and unpickled fully 53 per cent. of bunt. Table H wheat was split along the crease, planted on well manured land; 12.7 per cent. grew and produced 2bush. 52lbs. per acre. Grains halved across the middle and those on which the germs showed sown, produced 96 per cent. of plants, and at the rate of 22bush. 41lbs. The germs alone formed 90 per cent. of plants, but these remained somewhat poor as to tillering and height, and yielded 10bush. 38lbs. Grain with the germ injured did of course not grow. A crop which was hoed and weeded yielded 10bush. 26lbs.; another, hoed but not weeded, yielded only 3bush. 5lbs. From seed wheat of the last crop he had a crop of 9bush. 43lbs., while a sample seventeen years old, kept in a corked bottle, gave 7bush. 35lbs.

Members considered Mr. Grenfell deserving of the thanks of the residents of the district for the time and trouble he is devoting to these experiments and that the instruction obtained by his pupils in assisting him were bound to have a beneficial effect in the future.

### Alinit.

The CHAIRMAN read the following:—

Professor Dr. Edler, of Jena, writes to me *re alinit* that he is making experiments which have shown him that in certain cases through modes of cultivation, from which Caron expects a favorable development of his bacteria, really not only large increases of the crops, but also an increased gain of nitrogen was brought about, for which it is difficult to find a sufficient explanation unless you accept Mr. Caron's assertion as correct. I will send a copy as soon as in print. Professor Edler differs from my remarks made at Point Pass as regards bonemeal. He is not convinced by Professor Maercker to declare it of no value for phosphoric acid. No farmer working light soil would deny its efficacy. Dr. Kühn had also shown by experiments, not quite free from objections, that bonemeal is a phosphoric acid manure on light soil, which Professor Edler never doubted. Professor Maercker now found that it acts quite as well as Thomas phosphate if gypsum is added. Dr. Edler cannot understand why, but thinks perhaps to find yet another reason why bonemeal acts differently under different circumstances. He believes the physical peculiarities of the soil are of great proportional influence as regards the action of the phosphoric acid in bonedust.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical papers:—

203. *Seed Potatoes.*—In Germany, where diseases of potatoes are very frequent, attention has been lately specially called to the carelessness of potato-growers in regard to selecting and keeping their seed potatoes. In South Australia also better provision could be made to keep the seed from one season to another, which many must do if they have new kinds or cannot

readily exchange with others. Mr. T. B. Rybson recommends to keep them in dry sand; others may have had success with other means, and these will oblige by giving their experience. It is asserted that potatoes do not degenerate either in quality or in quantity of crop so long as they are properly treated, but this is not generally admitted, and it is quite certain that many old sorts are not constant, and are liable to vary considerably, irrespective of soil or climate. Degeneration and variation will most likely take place if potatoes did not ripen fully, or, as may here more frequently be the case, on account of drought, prematurely dried off. It is also certain that the starch in such potatoes diminishes with the smaller crop. If disease attacked the field any apparent sound tubers should not be used for seed (unless no others are obtainable), and where the growth suddenly stopped, the tubers not being full grown, will be poor in starch, and otherwise imperfect, are not likely to give a satisfactory crop. The longer potatoes grow the more starch will be found in them, and late sorts, therefore, always contain more starch than earlier. In the plains kidney and other early sorts are generally preferred on account of the uncertainty of a rainfall extending over many months. Potatoes checked in growth are likely to make only spindle-like shoots, and the thinner and less robust they are the smaller will be also the tubers, even if their number is greater. Only by manuring heavily and by planting at a sufficient distance from others is there a possibility of obtaining a better crop. Generally a potato plant will produce the largest crop from few but strong shoots, and these are only likely to be produced from tubers which, at the time of planting, had as yet no shoots, or these, at least, were not damaged. Some recommend the withering of potatoes to keep them longer from sprouting; but, unless the soil is moist enough at planting, this is not advisable. To select seed potatoes from the larger tubers and from those plants which gave the largest return is, without the least doubt, the best way to prevent degeneration, and this is no more than what is done by all intelligent farmers as regards cereals. The cutting of these, not too small, may of course give a larger number of plants, and each of these in a favorable year perhaps from 70 per cent. to 80 per cent. of the crop the whole tuber would have given you. As regards starch, the better of the early sorts—and amongst them the Early Rose—should contain on an average more than 15 per cent., the later sorts—and amongst them Magnum Bonum about 18 per cent., late sorts—like Imperator—19 and more per cent. The weather has, of course, a very great influence, and a difference of quite 1 per cent. or more is very frequent on that account. Still the percentage of starch in a sort is undoubtedly hereditary. It is advisable to try several sorts for each locality, which may differ considerably as regards soil and climate from others where particular sorts have given splendid results. Sorts which have been raised from seed in later years seem not only to contain more starch, but bid fair to have a greater immunity from disease; yet with selection of seed from the most prolific plants which show after boiling most starch, may still give good crops from old sorts without observing much or any degeneration. I do not believe in horse dung, except it has become almost a mould; and if potash is used it is better to use kainit (applied long before) than muriate of potash, which acts somewhat against the formation of starch, although the crop of more waxy potatoes may largely increase. The Permanent Nitrate Committee of London increased their crops of potatoes under the supervision of Dr. Munro through the application of nitrate of soda during the years 1893, 1894, and 1895, on an average, by 1 ton 16 cwt. per 1 cwt. of nitrate used. Professor Paul Wagner also had an increased weight of tubers, amounting to 1 ton 6 cwt. per acre, by the use of 1 cwt. of nitrate. Dr. Munro used, with 6 cwt. of nitrate, in two dressings, in some instances 2 cwt. phosphate of potash (equivalent to 4 cwt. mineral superphosphate and 2½ cwt. kainit) per acre, and obtained 20 tons 10 cwt. of potatoes per acre, while phosphate and potash alone, without nitrate, yielded only 9 tons 9 cwt. per acre. The ground had not received any farmyard manure for four years, and had since borne potatoes every year. By spraying twice with Bordeaux mixture the effects of any attack of potato disease was minimised, and the spraying prolonged the period of growth. Many of the farmers in Germany who cultivate potatoes on a large scale recommend the "Professor Maercker" as the best of all the newer kinds, and plant hundreds of acres with no other kind. They contain perhaps only 17½ per cent. of starch in a wet season against 20 per cent. in a dry season; but the crop is always good, and another advantage is that its white tubers are all close to the stem, thus giving no trouble in harvesting. "Athene" comes nearest to "Professor Maercker," but suffers in light land from drought. Some recommend the "Daber."

204. *Crows*.—Professor Dr. Roerig, of Königsberg, has for 110 days (from the middle of November to March) ascertained that 200 crows had consumed about thirty young hares, 11 lbs. of germinated and 62 lbs. of non-germinated wheat, against 4,000 mice and 110,000 large larvae of insects.

205. *Malton Wine*.—Dr. Sauer has at length been successful in producing wines from barley, which in every respect supply a substitute for the strong wines of Italy, Spain, and Portugal. Professor von Norden, of the City Hospital of Frankfurt a/M., reports in the Berlin clinical newspaper that "certain Malton wines, marked Tokay, Sherry, and Port wine, were used during the last six months in the above institution. They were almost, without exception, well liked by the patients, and mostly preferred to good Grecian and other Southern wines. The favorable influence of the Malton wines on the general health, the

stimulating effects on the exhausted nervous system, and the stirring up of the activity of the heart were found acting in the same manner as with wines containing a similar alcoholic strength. Patients with stomachic complaints found them quite wholesome and digestible, who previously had always complained of other wines. There is no necessity to give only the pure grape wine to patients; but few of them have the same nutritious value as Malton wines, and these are too expensive. The invention is an unexpected triumph of the German technical knowledge of fermentation, upon which medical men can only congratulate the inventor." And this opinion is held by a large number of sick persons and convalescents. But irrespective of the certificates of medical men, the German Emperor praises Malton wines as a very important invention for German agriculturists, they being already produced in large quantities to the exclusion of foreign heavy wines. The barley is malted as for beer, dried, roughly ground, and during the fermentation the temperature is kept between 50° and 60° Celsius to produce as much sugar as possible instead of dextrine at a higher temperature. To produce the fruit acid it is now necessary to add lactic acid in a temperature of 50° C., which destroys the germs of acetic acid, butyric acid, and other noxious acids. It has been fully ascertained that neither malic acid nor any other acid, except amber acid, has been found. The required acidity of from 0.6 to 0.8 per cent. having been reached in eighteen to twenty-four hours, the Malton wine is sterilised by being heated 70° to 75° R., but not boiled. After being cooled to 25° C., wine yeasts from Southern countries are added for the fermentation, and thus produced Malton tokay, Malton sherry, &c. The percentage of alcohol reaches frequently more than 18 per cent., and allows to store the young wine in a warm place, so that it is fit for consumption in six or eight weeks, and equal to grape wines of southern climes.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Angaston, Mr. E. Thamun; Robertstown, Mr. S. Carter; Pine Forest, Mr. E. Masters; Holder, Messrs. James Trimming, James Rossiter, and George Bennetts; Port Germein, Mr. D. Thompson; Kapunda, Mr. J. J. O'Sullivan; Clarendon, Messrs. D. Biliney and D. Thompson; Artherton, Messrs. M. and H. Baldock.

### Reports by Branches.

The SECRETARY reported receipt since previous meeting of thirty-two reports of Branch meetings.

## REPORTS BY BRANCHES.

### Mylor, March 5.

Present—Messrs. W. H. Hughes (Chairman), S. Pearce, R. J. Oinn, F. Rosser, S. W. Jackman, W. T. Elliott, T. Mundy, R. S. Mundy, F. G. Wilson, P. P. Probert, W. G. Clough (Hon. Sec.), and nine visitors.

EXHIBITS.—A considerable number of specimens of apples were tabled for information of members and visitors in respect to names and appearances.

APPLE-PACKING.—The Hon. Secretary read a paper giving hints on packing apples for export. Members were of opinion that apples should not be wiped before packing. The best way to grade apples was to have three pickers—one to pick only large apples, another to pick the next size, and the third to strip the rest off the trees. Mr. Probert thought the dry stringybark would do better than paper shavings for packing.

SEASONABLE HINTS.—Harvest late apples. Sow green feed.

### Millicent, March 3.

Present—Messrs. R. Campbell (Chairman), H. Hart, H. F. Holzgreffe, H. Oberlander, H. Stewart, W. R. Foster, W. J. Whennen, B. Varcoe, A. McRostie, and E. J. Harris (Hon. Sec.).

RESIGNATION.—Upon receipt of resignation by Mr. T. Searle of his seat as

a member of this Branch mention was made of his valuable efforts in experimental cultivation of seeds sent out for trial by the Central Bureau.

**CROSSBRED LAMBS.**—Discussion was resumed upon papers previously read by Messrs. S. J. Stuckey and J. H. Williams upon this subject. Members generally agreed that such breeding was only suitable for fat lambs for market. Thanks were accorded to the writers.

**CORRESPONDENCE.**—A great deal of correspondence of purely local interest was dealt with.

**RAINFALL.**—For month of February, '980; and to date in March, '390. For past seventeen years:—1880, 30·565; 1881, 24·540; 1882, 25·210; 1883, 35·820; 1884, 33·745; 1885, 28·410; 1886, 26·770; 1887, 30·250; 1888, 29·120; 1889, 37·690; 1890, 29·811; 1891, 25·350; 1892, 26·395; 1893, 33·835; 1894, 33·365; 1895, 33·110; 1896, 28·760; 1897, 23·945.

**WEATHER REPORT.**—Very dry weather experienced during December, January, and February until 26th and succeeding days, when copious rain fell.

**SEASONABLE SOWINGS, &c.**—*Field*: Sow turnips, barley and rye for green feed; also rape, kale, and mustard. *Garden*: Early potatoes for seed for next season, and for early crops where not liable to frost; broad beans, early cabbage, lettuce, celery, broccoli, cress, turnips, carrots, parsnips. Plant out cabbages. For green feed  $\frac{1}{2}$  bush. of rye is sufficient.

**EXHIBITS.**—Mr. R. Campbell tabled well-grown Russian sunflowers, Broom corn, Swedes, four varieties of early potatoes, and saltbush. Mr. W. Whennen exhibited Dart's Imperial wheat and Danish Island oats. Mr. Hart said he had heard that Dart's Imperial wheat is much grown in Victoria. Mr. Vercoe tabled some roots of canaigre. He had grown this for several years, and had concluded that it is not worth the trouble. He would present roots to anyone who wished to try it.

**BOXTHORN.**—Mr. W. R. Foster read a paper on boxthorn, and a discussion took place upon the best tool to cut this hedge with. Amongst them were old scythes on handles, the bush axe, and a grass hook on a long handle. Mr. Foster said a piece of fence wire drawn round a heap was a good way of drawing the cuttings to a place for burning. [Put on a pair of thick long-sleeved gloves, and plait the branches of the boxthorn horizontally with each other as often as possible, instead of cutting them. If this is done regularly from the time the plants are 10in. high until 6ft. high there will be a dense quick growth which even a cat cannot get through. By training the plants horizontally a great many lateral shoots will be forced to grow, and as there has been nothing cut away the growth will be correspondingly rapid.—GEN. SEC.]

**HOME-MADE IMPLEMENTS.**—Mr. Campbell suggested that members should exhibit at Branch Conferences examples of home-made implements—such as flails, grass forks, swingle-bars, &c. Some members thought flails would be considered old fashioned, but others found them quite useful still in dealing with small lots of grass seeds, rape, wheat, &c., for seed. Reference was made to Mr. Hart's method of dealing with rape, mustard, &c. He uses a close-floored trolley on three wheels, drawn through the field and thrashing or tramping as it goes. This was approved as a splendid idea, and Mr. Hart said, if made with old wheels, would cost no more than a tarpaulin. A discussion on swingle-bars ensued, and eye bolts and ferruled eyes each had their adherents.

### Port Elliot, February 26.

**Present**—Messrs. C. H. Hussey (Chairman), P. O. Hutchison, H. Green, E. Wood, H. Pannell, F. T. Fischer, W. E. Hargreaves, O. J. Whitmore, J. Brown, and E. Hill (Hon. Sec.).

**OFFICERS.**—Messrs. C. H. Hussey and E. Hill were re-elected Chairman and Hon. Sec., respectively, for ensuing year.

**EXHIBITS.**—Mr. Fischer tabled cone of Bunya bunya (*Auracaria Bidwelli*), grown at Hindmarsh Valley. This made a very handsome tree, was hardy, and bore fruit every third year. The fruit is edible. Mr. Whitmore tabled sample of Dart's Imperial wheat, and Mr. Green samples of Wantage and Sultana grapes grown at Port Elliot. The Sultanas were very fine.

**HEAVY WHEAT.**—Mr. Brown reported having taken to the mill twenty-eight bags of this season's wheat, weighing 67lbs. to the bushel.

### Mount Remarkable, March 2.

**Present**—Messrs. S. Challenger (in the chair), A. Pope, W. Lange, C. E. Jorgensen, T. P. Yates, and T. H. Casley (Hon. Sec.).

**ANNUAL REPORT.**—The Hon. Sec.'s annual report showed that during the past year twelve meetings were held, with an average attendance of eight members. Six papers had been read, and numerous subjects of practical interest discussed. Two members had been struck off the roll for non-attendance, and one had died. The experiments with Bureau seeds had generally been a failure, owing to drought.

### Pyap, February 26.

**Present**—Messrs. K. F. Huselius (Chairman), T. Teale, G. Clarke, T. Smith, C. Billett, J. Holt, W. Axon, F. Muirhead, H. Mills, W. C. Rodgers (Hon. Sec.), and three visitors.

**OFFICERS.**—Mr. G. A. Clarke was elected Chairman for ensuing year.

**TOMATOES.**—Mr. Huselius reported the Matchless tomato had not been a success; the plant did not thrive, and the fruit failed to mature. Mr. Teale strongly advocated trellising. He found he got far better fruit from his trellised plants. Other members agree that they should either be trellised or branches placed underneath to keep them off the ground and allow free circulation of air.

**MALLEE CUTTING.**—Mr. Huselius was of opinion that it did not matter what season the mallee was cut, the buds were sure to shoot again. Treatment with fire two or three times was effective.

**WHEAT.**—Mr. Huselius recommended Dart's Imperial and Purple Straw as the best wheats for this district. Mr. Teale strongly urged giving the seed-drill and artificial fertilisers a trial on the settlement.

### Kapunda, March 5.

**Present**—Messrs. W. Flavel (Chairman), Patrick Kerin, Peter Kerin, T. Scott, J. G. Harris, J. A. Schultz, and T. Jeffs (Hon. Sec.).

**CONFERENCE.**—The Hon. Secretary reported that all arrangements had been made for holding a Conference of the Lower Northern Branches at Kapunda on April 6.

**CATTLE DISEASES.**—Mr. Schultz reported having lost several cattle from a disease unknown to him. They were in splendid condition, but stiffness set in in the legs, they became costive, and died after a few days' illness.

**Eudunda, March 7.**

Present—Messrs. J. von Bertouch (Chairman), E. T. Kunoth, J. W. Kriebel, H. D. Wiel, A. M. Twartz, and F. W. Paech.

CONFERENCE.—The Chairman promised to read a paper at Kapunda Conference on April 6, on "Defects of Farming in the Eastern Hundreds, and how to Improve the Present System." Several members promised to attend the Conference.

WHEAT.—It was decided to write Professor Lowrie inquiring which variety of wheat has given best results at the college during the past three years.

**Arthurton, February 26.**

Present—Messrs. W. Short (Chairman), M. Lomman, J. Pearson, W. Smith, H. J. Freeman, H. Short, W. H. Hawke, J. B. Rowe (Hon. Sec.), and three visitors.

VISIT TO HOMESTEAD.—This meeting was held at the residence of Mr. W. Smith, and before the ordinary business was transacted members inspected the farm buildings and appointments. Members were particularly struck with the orderly appearance of everything about the place, and with the water supply for the house. The large stable which was formerly thatched was covered with iron over the thatch, the sheets being on rafters and battens, which are securely fastened by means of wire to the original rafters. This not only gives a good catchment area, but makes the stable watertight, cool in summer, and warm in winter.

DRILLING AND MANURING.—Mr. Freeman considered the great advantage of drilling in the seed with manure was that they could crop their land for two years in succession. He did not consider that the extra crop on well-fallowed land would pay for the extra expense. The Hon. Sec. and Mr. Hawke, however, were satisfied that it had been proved that the practice of drilling and fertilising crops on well-fallowed land was distinctly profitable.

BUNT.—Mr. Freeman said he noticed it stated that the seed drill rather tended to increase the difficulty of contending with bunt, and asked the best way of freeing the wheat from the bunt spores before sowing. Some members favored blowing the wheat with the cleaner with a sieve similar to an oat sieve, but one that would take the wheat nearer to the tail of the machine. The bunt balls would then blow over, and the wheat could then be pickled in the usual way. Other members favored washing the wheat in a tub before pickling, as then the bunt balls would float on the top and could be easily removed.

DISEASE OF PIGS.—Mr. Lomman reported deaths of a number of pigs, young and old. They were in a large yard portion of which was covered in; they had plenty to eat and drink, but were not overfed. He moved them from one place to another for shelter, but without result. They got sleepy and stupid, and soon died. Members attributed it to heat apoplexy.

**Gladstone, March 5.**

Present—Messrs. J. Tonkin (Chairman), E. Matthiessen, B. Griffiths, J. H. Rundle, J. Gallasch, J. King, J. Shephard, W. A. Wornum, and J. Milne (Hon. Sec.).

RAINFALL.—The Chairman reported rainfall recorded for February 400in.

FARMING.—Considerable discussion took place on paper on this subject read at previous meeting by Mr. King. Mr. Tonkin considered Mr. King's estimate of loss caused by stripper too high, but other members pointed out that not

only was the actual loss in stripping to be taken into account, but also the risk of damage by winds and rust with the crop left until ripe enough to strip. Members considered the extra value of the binder straw, which could be chaffed and used with hay chaff—a matter of much importance. In reply to a question as to quantity of grain shaken out when carting the sheaves, Mr. King stated that he placed canvas in the bottom of his wagons, and found the amount of grain shaken out was less than 2bush in carting 100 tons of sheaves, and of course this was not lost. Most of his crop was cut with the binder, and thrashed with a steam thrashing machine, which cost £140.

**FIELD TRIAL.**—Mr. Shephard reported on arrangement made for field trial of seed drills, ploughs, &c., at Crystal Brook, on April 5.

**SEED EXPERIMENTS.**—Members reported failure of experiments with Bureau seeds during past season.

### Forster, March 7.

Present—Messrs. J. Sears, F. Towill, F. Johns, J. Johns, J. Retallack, W. Bennett, and three visitors.

**HON. SEC.**—Mr. W. Bennett was appointed Hon. Sec., *vice* Mr. J. Sears, resigned.

**MALLEE-CUTTING.**—Members were of opinion that it made no difference when mallee was cut, as it always grew again.

### Boothby, March 8.

Present—Messrs. J. T. Whyte (Chairman), J. Bell, R. Chaplin, H. S. Robinson, T. Robinson, R. M. B. Whyte (Hon. Sec.), and two visitors.

**WHEAT.**—A discussion took place on the question of the best varieties of wheat to sow in this district during March. Members were agreed that late varieties, such as Ward's Prolific, Blount's Lambrigg, Leak's Rustproof, Scotch Wonder, &c. should be sown now. A discussion also took place on the necessity for starting a flourmill in the neighborhood. It was pointed out that this was a large wheat-growing locality, and that large quantities of flour, bran, and pollard were imported into the district. The members were of opinion that a mill at Franklin Harbor would pay well.

**FEEDING WHEAT CHAFF.**—Members were of opinion that the best way to feed wheaten chaff to horses was to steam or soak it first.

### Nantawarra, March 7.

Present—Messrs. S. Sleep (Chairman), James Nicholls, R. Nicholls, A. F. Herbert, E. J. Herbert, R. Uppill, E. Pridham, and T. Dixon (Hon. Sec.).

**FIELD TRIAL.**—Matters in connection with Field Trial Society were dealt with. It was decided to recommend that the next trial be held close to a railway station, and that money prizes be not granted. A discussion took place on the lightness of draught of the prong mouldboard ploughs, most of the members being of opinion that they would prove of value in their heavy clay soils.

**SEED EXPERIMENTS.**—The Chairman reported failure of his experiments with Bureau seeds. Mr. Uppill said his cucumbers had done well, but the squashes failed to set fruit.

**FRUIT-GROWING.**—Mr. Uppill tabled splendid samples of Salwey peaches, two fruits weighing 1lb. Mr. E. M. Sage, of Balaklava, forwarded samples of Kelsey plums, which were much admired.



**SHEEP DISEASE.**—Mr. Uppill reported having had a number of young sheep, principally two-tooths, die from some complaint. They were running in a paddock in which there was plenty of food and water, and were in splendid condition. They were first affected with lameness similar to that from which cattle suffered. On killing one he found the flow of blood very small, and on skinning it the flesh upon the brisket was black, with clotted blood between the skin and flesh.

### Colton, March 5.

**Present**—Messrs. P. P. Kenny (Chairman), A. A. Stephens, E. Whitehead, M. S. W. Kenny, W. L. Brown, J. L. Higgins, John Shepard, W. McElder, R. Hull (Hon. Sec.), and one visitor.

**ONIONS.**—In reply to question, Mr. Brown stated that he had good results from Brown Spanish onions on dry limestone soil.

**WHEAT ON MALLEE LAND.**—In reply to inquiry *re* best wheats to sow on mallee scrub land, members had not sufficient experience to answer.

**WILD DOG PEST.**—Considerable discussion took place on this matter, members reporting serious losses of sheep. Wool being one of the main staples of the district, members were of opinion that the Government should subsidise money raised by the local governing bodies for dealing with this evil. Over 100 dogs have been killed by means of poisoning in the outside unoccupied country, and unless this system of dealing with the dogs is kept up sheep will not pay to keep. Owing to the limited means at the disposal of the local bodies, this expenditure cannot be kept up for any length of time unless the Government render some assistance.

### Calca, March 5.

**Present**—Messrs J. Bowman (Chairman), A. B. Smith, A. Plush, A. Newbold, D. P. Thomas (Hon Sec.), and four visitors.

**WIRE FOR FENCING.**—Mr. Plush showed samples of steel and drawn fencing wire; also tarred wire to show effect of tarring as a preventive of rust. The steel wire was completely eaten away with rust, though only erected seven years, while the drawn wire, which had been up for eighteen years in the same locality, was in good order. A piece of wire tarred with coal tar on one side was quite sound on that side, but completely rusted away on the other. Mr. Bowman stated that he had proved that wire made hot and then dipped into hot linseed oil was proof against rust, even near the coast.

### Mundoora, March 4.

**Present**—Messrs. G. Haines (in the chair), T. Watt, W. Aitchison, R. Harris, N. J. Francis, W. Atkinson, J. Loveridge, W. J. Shearer, D. Smith, W. D. Tonkin, and A. E. Gardiner (Hon. Sec.).

**OFFICERS**—Messrs. J. Blake, W. Aitchison, and A. E. Gardiner were elected Chairman, Vice-chairman, and Hon. Sec., respectively, for ensuing year.

**SEEDING.**—A long discussion took place on the best way, apart from the seed drill, of sowing wheat. Mr. Harris said he had been experimenting with different methods for a number of years, and was convinced that for most lands, especially fallow, the cultivator was the best. He found Gregory's patent cultivator very satisfactory. With this implement a satisfactory area can be put in daily, and the land is left in almost as fine tilth as if harrowed well. Mr. Francis also spoke strongly in favor of this implement, which even

on very stony patches did well. For putting in seed or working the fallow it was very good. Mr. Smith used the scarifier for putting in the seed on the fallow, cross-harrowing if possible, but believed the cultivator would be more suitable where the land is not too stony or inclined to set hard. On land not fallowed Mr. Atkinson advised ploughing when moist or damp, sowing the seed on top, and then harrowing. Mr. Loveridge always puts in a large portion of his crop in this way, but finds it difficult to always have the land as damp as he would like before ploughing. One of his neighbors sowed the seed first, and then ploughed it in, but, as he always got a smaller yield this way, it seemed to him that ploughing in the seed in this district was not satisfactory. Mr. Aitchison said he gave this method a fair trial for several years, but the crop so sown was always badly affected with black rust. He found he got far better results from ploughing up the land, then sowing and harrowing.

**PLUMP AND SHRIVELLED SEED WHEAT.**—A discussion on this subject took place. Several members gave their experiences in sowing shrivelled and plump grain, in many cases side by side in the same paddock, the results being generally in favor of the shrivelled seed. Members were unanimously of opinion that the only advantage of the large grain was that in case the plants got a bad start those from the larger grains would stand best.

### Petersburg, February 18.

Present—Messrs. W. Miller (Chairman), R. Cochrane, Thomas Selby, A. Dowd, W. Waters, F. W. Sambell, James Wilson (Hon. Sec.), and four visitors.

**STOCK COMPLAINTS.**—Some discussion took place on disease causing death of cattle on Mr. Cochrane's farm. Mr. Cochrane reported that one of his horses was suffering from stiffness in the limbs. At one time his fore legs and at others the hind legs were affected. He was in good health and eats well, but is unable to work.

**MANURES.**—Mr. Cochrane reported on trials of manures presented to the Branch by Mr. F. H. Snow. Kainit, Thomas phosphate, and muriate of potash were applied to different plots, the land being all treated alike and sown with wheat on July 7. Owing to the severity of the season the plots treated with kainit and potash and the unmanured land adjoining were not worth reaping, while the plot treated with Thomas phosphate was little better, though it promised well until the dry weather set in. He believed that in an average season this manure would prove profitable in this district. Mr. Selby reported as follows on his experiments, the seed being drilled in:—Four acres, drilled in with 45lbs. wheat per acre, without manure, yielded 4bush. 42lbs. per acre; six acres, drilled in with 1cwt. bone phosphate and 45lbs. wheat, 3bush. 45lbs. per acre; four acres, drilled in with 1cwt. Thomas phosphate and 45lbs. wheat per acre, yielded 4bush. 14lbs. per acre. The wheat was drilled in at end of March, and some of the manured plots sprang at once, but died off, while it was thirteen weeks before sufficient rain fell to bring up the rest of the seed, when the unmanured plot was thickest. The plot manured with bone phosphate failed at the first approach of the dry weather, while that treated with Thomas phosphate stood the drought best. He believed he made a mistake and sowed the seed too deep. Mr. E. Bradtke said he put all his crop in with the drill last season, and manured with superphosphate, all except a strip here and there. These strips showed out very prominently throughout the season, and returned quite one-third less than the manured crop. His crop averaged 8bush. per acre, the grain being very good and much superior to that grown on unmanured land around him. On the poor

red land the difference was most noticeable. He had great faith in this mode of seeding, though it entailed more work than broadcasting and harrowing the seed in. The drilled wheat stood up much better than the broadcasted. His son had a paddock which was fallowed, except in the centre, which was ploughed up and sown late with the drill, the other being broadcasted. The drilled portion gave far the best return. Vegetable seeds put in rows with a little super failed to grow. Members expressed some surprise at the difference in Messrs. Bradtke's and Selby's results, the farms only being a few miles apart. It was stated, however, that, though so near each other, the rainfall at Mr. Bradtke's was appreciably heavier than at Mr. Selby's.

### Lucindale, March 5.

Present—Messrs. S. Tavender (Chairman), A. Matheson, J. Bourne, H. Langberg, W. Dow, and H. J. Deeble (Hon. Sec.).

FODDER PLANT.—Mr. Matheson tabled specimen of fodder plant growing luxuriantly around the swamps in the district. One resident has 120 sheep on forty acres on which this plant is growing, and they cannot eat it down. Sheep fatten on it very rapidly. To be forwarded to the Central Bureau. [This is *Portulaca oleracea*, a quick-growing summer annual, indigenous to Australia and highly valued in our pastoral districts, where it springs very quickly after summer rains.—GEN. SEC.]

BIRD PESTS.—Mr. Tavender reported having poisoned a number of pears and apples by painting them with mixture of four parts finely-ground sugar to one of arsenic. The fruits were fastened to the trees by means of wire, so as to prevent their being picked, and at least two out of every three had been eaten by the birds, although he had not seen any dead ones about. Mr. Bourne said he sowed sunflowers, the seeds of which the birds preferred to fruit, and he had not been much troubled by the birds. Mr. Langberg advocated covering the whole garden with wire netting and keeping two or three large hawks to destroy any small birds that got through the meshes. He felt sure he could so cover his garden at a cost of £20, and it would pay. Members generally thought the past two dry seasons had been the real cause of the trouble with the birds, and that with a return of better seasons they would return to their natural food, which would be in abundance.

### Redhill, March 7.

Present—Messrs. A. A. Robertson, (in chair), D. Lithgow, H. Darwin, R. Siviour, G. Wheaton, R. B. P. Bailey, T. McDonald (Hon. Sec.), and one visitor.

SHEEP.—Considerable discussion took place on sheep on farms. Mr. Wheaton considered an improvement in the breed required. They wanted a good mutton sheep that would also produce good wool, and he believed that breeders could produce such animals by careful selection and breeding. In the Lincoln and Merino breeds they had two useful sheep, but one produces good mutton and poor wool, while the other give poor meat and first-class wool. Mr. Siviour said he found it paid him better to buy sheep from the Northern flocks and fatten them than to breed them, though he believed a profitable business could be done by the farmer in breeding early-maturing lambs. Mr. Lithgow said he raised a few lambs every year and finds it pays. For mutton sheep they required animals with clean legs and head. Many breeds now being raised were so covered in wool on the head that they can scarcely see their way about.

### Crystal Brook, March 5.

Present—Messrs. W. J. Venning (Chairman), W. Hamlyn, W. Nott, J. Chambers, E. Pope, E. Dabinett, Dr. A. H. Bennett, W. Morrish, J. Forgon, A. Ferguson, R. Pavy, and G. Miell (Hon. Sec.).

FIELD TRIAL SOCIETY.—Matters in connection with the forthcoming field trial of seed and manure drills, ploughs, cultivators, &c., to be held near Crystal Brook on Wednesday, April 6, under the auspices of the North-Western Bureau Field Trial Society were dealt with. Several manufacturers have intimated their intention of competing, and a successful trial is expected.

HARVEST.—Members estimated that the average for the district was about  $3\frac{1}{2}$  bush. per acre, some crops going 6 bush. and others being very poor.

### Swan Reach, March 3.

Present—Messrs. P. A. Hasse (Chairman), J. O. J. Kohnke, A. G. Zadow, F. Fischer, F. Brecht, L. Fidge, J. Scott, P. A. Beck (Hon. Sec.), C. Droge-muller (of Bowhill Branch), and two visitors.

BRANCH SHOW.—Considerable discussion took place on the suggestion of Bowhill Branch that a united show of the products of the river district be organised by the Swan Reach, Forster, and Bowhill Branches. Members favored the idea of holding such a show, but it was decided to suggest that the show be held in a central place and that all the river Branches be invited to participate.

CO-OPERATION.—Discussion took place on the aims and objects of the South Australian Farmers' Co-operative Union, and it was decided to support the union.

### Mount Compass, March 8.

Present—Messrs. J. S. Youlton (Chairman), W. Gowling, W. Wright, D. Wright, C. S. Hancock, A. J. Hancock, T. Chaplin, M. Jacobs, S. Athurs, E. Good, R. Peters, H. McKinlay (Hon. Sec.), and nine visitors.

EXHIBITS.—Mr. Gowling tabled sample of Algerian oats, and Mr. Hancock Dart's Imperial wheat and French Honeysuckle. The wheat was sown on land which had previously grown sunflowers, in rows 4in. x 6in. apart, at the rate of 20lbs. of seed per acre, and yielded equal to 22bush. per acre. The plants were hoed in the early part of September, and made from nine to eleven stools each; the grain was fine and plump.

POTATOES.—Mr. Jacobs read the following paper on "Potato Cultivation":—

The main crop of this district is, and will be for some years to come, the potato. Therefore it behoves us to study as much as possible the best method of keeping seed, planting, and cultivating. I favor keeping the seed in the open, spread as thinly as possible, with just enough covering to protect from frosts. For the size of sets I prefer one that will cut and make two, as the shoots seem to be of stronger growth. The first growth is better rubbed off, as they throw up more shoots with the second, and two or three shoots are more productive than one, although the tubers are not so large. You also get a more even crop, unless you take great care in saving your seed. Planting may be started here the beginning of November, and be continued until the end of January, but I think the best time is as near Christmas as possible. If the ground has been prepared for planting and no manure put in it, the best way is to draw out drills 2ft. apart and from 4in. to 6in. deep, place the sets in the trench from 8in. to 9in. apart, pressing them down firmly with the foot, which will make an inch difference to the depth of the trench and make a bed for the set; then put in the manure and pull the earth back with the rake, pressing firmly. My reason for putting the manure in the trench is that the plant gets the whole of it for use if required, but if sown on top and turned in with the spade a good proportion goes too deep and is lost. But the best way to plant is to turn the ground and plant at the same time, planting in the trench the same as when drills are drawn out. There is no need to walk over the ground. You are sure the sets are

well covered, and it saves time. I have found the best manure to use in new ground is bonedust the first or even the second year, but after that the manure must be suited to the ground. I have obtained the best results this year from a mixture of ten parts bonedust, ten parts guano, one part potash. Using them separately, the bonedust is best. I find the potatoes most suited to our swamp are the Elephant and Early Rose, which seem to give good results, planted early or late. The plants should be hoed as soon as you can see the rows, and when banked care should be taken to pull the earth close around the plants to protect the tubers from the sun and grubs. When digging your crop cover the potatoes well and keep damp if possible, as the moth will not go where it is damp. I prefer putting the potatoes in heaps and covering with earth, where they will keep three months, if wanted.

Members generally agreed with the paper, but some considered that the sets should be one foot apart between the rows.

### Woodside, March 7.

Present—Messrs. R. Caldwell (Chairman), J. H. Snell, J. Cuthbertson, R. W. Kleinschmidt, J. Hutchens, J. C. Pfeiffer, R. P. Keddie, A. Pfeiffer, C. W. Fowler, and G. F. Lauterbach (Hon. Sec.).

**STANDARD WEIGHT OF BAGS OF CHAFF AND WHEAT.**—Mr. Kleinschmidt moved that steps be taken to endeavor to obtain a legal standard weight of 42lbs. gross for a bag of chaff. At present dealers could sell a bag of chaff of any weight they choose. He knew of cases where chaff had been sold in bags containing only 35lbs., and this was unfair to those merchants who gave 40lbs. nett to the bag, as the former could naturally undersell the latter, as buyers did not weigh each bag. Members agreed with this, and the motion was carried unanimously. Mr. Caldwell pointed out that it would be necessary to obtain the co-operation of those interested in the matter, and the General Secretary should be requested to advise as to best means to be taken to attain the desired end. Mr. Keddie suggested that steps should also be taken to reduce the capacity of the wheat bag to 3bush., but other members considered it was not advisable to make any alteration, as there are bag-lifters and other easy means of handling the bags. Mr. Keddie also thought that it should be compulsory, where wheat chaff is made from hay from which the grain has been abstracted, that the bags should be branded as such.

### Gawler River, March 7.

Present—Messrs. A. M. Dawkins (Chairman), T. P. Parker, H. Heaslip, G. Johnston, J. Hillier, A. Bray, F. Roediger, J. S. McLean, and H. Roediger (Hon. Sec.).

**MANURING.**—Considerable discussion took place on the use of the seed and fertiliser drills. Mr. Parker thought wet weather would interfere with their use on sticky soil. Mr. Heaslip thought it would be advisable to drill some of the fertiliser in beforehand, so as to facilitate work at seed time. The Chairman said care should be taken not to drill the seed in too deep, as the plant would form adventitious roots near the surface. He had had satisfactory results last season from Kangaroo Island guano.

**RAINFALL.**—January, nil; February, 0.830.

### Kanmantoo, March 9.

Present—Messrs. J. Downing (Chairman), E. Downing, Thomas Hawthorne, F. Lehmann, P. Lewis, and W. G. Mills (Hon. Sec.).

**APPLES FOR EXPORT.**—Members were of opinion that, owing to the scarcity of fruit, there would be no apples in this district available for export.

**SEED DRILLS.**—Considerable discussion took place on the use of the seed and fertiliser drills, the members being of opinion that the chief advantages were the putting in of the seed and manure together, the saving of seed, and the proper covering of the seed, protecting it from birds.

**CAPE OATS.**—In reply to question, members were of opinion that generally early sown Cape oats gave better results than late sown, but that it largely depended upon local circumstances.

**MANURING.**—Mr. E. Downing said he noticed his cattle and horses left the grass land and ordinary stubble to feed on the stubble on land manured with commercial fertilisers.

### **Hartley, March 10.**

Present—Messrs. C. Harvey (Chairman), W. Klenke, W. Kutzer, H. Reimers, A. Thiele, A. Dalton, and one visitor.

**FRUIT-GROWING.**—Considerable discussion took place on the best varieties of fruit trees to grow in this district. Members were of opinion that apples, apricots, and early plums were the only profitable trees to plant, as most other kinds do not bear well or sell at a profit. Peaches grow and bear well for two or three years and then die.

### **Holder, March 5.**

Present—Messrs. F. A. Grant (Chairman), T. Basford, E. Crocker, J. Maddocks, J. O'Connell, P. J. Brougham, F. Slater, F. Rogers, J. Mitty, W. J. Green, H. Blizard, C. Anderson, J. J. Odgers (Hon. Sec.), and nine visitors.

**ANNUAL REPORT.**—The Hon Sec.'s annual report showed that during the past year twelve meetings were held, with an average attendance of nine members. Four practical papers have been read, and these, with numerous other practical subjects, well discussed. A number of seeds received from the Central Bureau have been tried, with varying, but on the whole encouraging, results, several splendid exhibits of vegetables grown from these seeds having been tabled at the meetings. Messrs. F. A. Grant and J. J. Odgers were re-elected Chairman and Hon. Sec., respectively, for the ensuing year.

### **Robertstown, March 9.**

Present—Messrs. N. Westphalen (Chairman), G. H. Rohde, G. Dalatz, F. Fielder, W. Mosey, A. Rohde, W. Armstrong, and one visitor.

**HON. SEC.**—Mr. S. Carter was appointed Hon. Sec., *vice* Mr. B. A. McCaffrey, who has left the district.

**SPARROWS.**—Considerable discussion took place on pamphlet from Central Bureau on sparrow destruction. One member mentioned that the sparrows had been cleared in one locality by means of dishes containing poisoned wheat being placed in the branches of the fruit trees. A member stated that the poisoned wheat usually sold did not seem to have any effect on the sparrows that eat it.

### **Port Pirie, March 11.**

Present—Messrs. E. J. Hector (Chairman), E. Stephens, J. Lawrie, G. Robertson, T. Gambrell, G. Hannan, and G. M. Wright (Hon. Sec.).

**OFFICERS.**—Messrs. E. J. Hector and G. M. Wright were re-elected Chairman and Hon. Sec., respectively, for the ensuing year.

**STOCK COMPLAINTS.**—Mr. Stephens reported loss of several cattle lately. They were in good condition, but went off their feed, lie about, and became stiff in the limbs. On being opened he found the small paunch, or "bible," as hard as a stone. [Impaction of the omasum, caused by eating fibrous and innutritious food. For preventive and remedial treatment see *Journal of Agriculture and Industry* for February, page 563.—GEN. SEC.] Mr. Hector reported loss of young pigs. He had not losses until purchasing a boar from the Sewago Farm, and all of his litters have died. The pigs were running on lucern, were rather poor, and came out in lumps on their sides and heads, frothed at the mouth, and with staring eyes.

**COPRA CAKE FOR PIGS.**—Mr. Stephens reported satisfactory results from feeding copra cake to pigs. A bushel of cake, costing 1s. 6d., will be sufficient for two large pigs for ten days, and they will fatten rapidly on it.

### Arden Vale, March 7.

Present—Messrs. A. Hannemann (Chairman), M. Eckert, C. Pearce, A. W. Fricker, D. Liebich, L. E. Warren, F. Schuttloffel, P. Starr, and E. H. Warren, (Hon. Sec.).

**MANUFACTURE OF OATMEAL.**—Mr. Schuttloffel initiated a discussion on this subject. He pointed out that about 1,000 tons of oatmeal were imported into South Australia annually, for which the consumer paid £18,000. Oatmeal was a most nourishing food, and he thought it a pity that so much money should go out of the colony for an article which should be produced here. Over a large area of Prussia every man makes his own oatmeal. He simply soaks a few bushels of oats in hot water until swollen, then dries them, and crushes in an ordinary handmill. He thought the manufacture of oatmeal in South Australia should pay, as there was a duty of £2 per ton on this article. Mr. Pearce thought there must be some defect in our oats, or we lacked the necessary machinery; otherwise the matter would have been taken up before. Mr. Eckert thought the benefits derived from growing a few oats and making oatmeal on the farm would be counterbalanced by the injury caused to other crops by the oats spreading. In reply to inquiry, the Chairman stated that he saw oats harvested with the ordinary stripper in the South. After further discussion the following motion was carried:—"We beg to draw the attention of the Central and Branch Burcaus to the very large quantity of oatmeal imported annually, and that, with a view to encouraging the growth of suitable kinds of oats and the manufacture of oatmeal, the General Secretary be asked to collect and publish the best information obtainable on the subject."

**VERMIN-PROOF FENCING.**—The Hon. Sec. opened a discussion on this subject. There was now no doubt about the utility of the 3ft. 6in. netting, of small mesh, for keeping out the rabbits, and while the locally bred rabbits could probably be kept down by means of phosphorised pollard, the fence was necessary to prevent incursions of rabbits from the adjoining sheep runs. Where a farmer kept sheep he should make the fence dog-proof also; 4ft. 6in. netting attached to a barb wire let 3in. into the ground and supported by two steel wires, surmounted by two barb wires 4in. and 5in. apart, the netting securely laced to the top barb wire by small galvanised wire at every 3ft., would make a fence secure against rabbits and dogs. The use of wire netting for fencing should result in the profitable occupation of large tracts of country now abandoned. Mr. Pearce said he had sheep country adjoining his land on one section, and found he could keep down the rabbits with phosphorised pollard. He believed such a fence as described by Mr. Warren would keep out dogs, but on rough country it would require much supervision. Mr. Fricker

considered it would pay to wire net the farms, as not only would the rabbits be kept out, but also euros and wallabies. The netting would last good for from ten to fifteen years. Other members did not consider rabbits could be kept down in a good season on rough country by means of phosphorised pollard.

**FLOUR MILL.**—The discussion on the necessity for a flour mill at Quorn and on the miller's charges for gristing was continued. Some of the members did not think the Alpha grinder would do good enough work, and that if anything was done to establish a mill it should be done by the Farmers' Union.

**MALLEE-CUTTING.**—Members stated they found that whatever time of the year the mallee was cut it would sprout again

### Johnsburg, March 5.

Present—Messrs. F. W. Hombsch (Chairman), H. Napper, L. Chalmers, G. H. Dunn, W. McRitchie, and three visitors.

**EXHIBIT.**—Mr. Dunn tabled spring hook made from steel bands round wheat sack bales. Members considered the hook very useful for coupling bit-straps and the ends of reins.

**BUNT.**—Considerable discussion took place on the efficacy of bluestone pickle as a preventive of bunt. Mr. Dunn said he had not pickled seed for dry sowing for years, but intended to do so this season, as he believed, owing to the exceptionally dry state of the soil the bunt germs had not germinated and would therefore start with the wheat. The Chairman said he knew of a number of instances where washing the bunt balls out had proved of no use. Mr. Chalmers said in some cases unpickled seed was sown and portion of the crop is quite clean, and other parts badly affected. Members thought the weather had a great deal to do with the prevalence or absence of bunt. Mr. W. Napper stated that in his district farmers never pickled the same wheat for two years in succession.

**ROLLING.**—The Chairman said he had been experimenting to see the effect of rolling the crop. A portion was rolled before the crop came up, another portion just after, and another a fortnight later. Rolling before the crop came up had a marked effect, but later rolling was of no benefit. Mr. Chalmers said his experience was the same; rolling before the crop is through, especially after light rain, is very beneficial.

### Golden Grove, March 10.

Present—Messrs. T. G. McPharlin (Chairman), S. A. Milne, F. Buder, John McEwin, W. J. Rhen, and Alexander Harper.

**HON. SEC.**—In consequence of the removal of the late Hon. Sec. from the district Mr. Alexander Harper was appointed in his place. Other business of local interest was transacted.

### Dawson, March 5.

Present—Messrs. C. W. Dowden (in chair), S. Chapman, C. H. Meyers, O. Muller, A. H. Warner, Thomas Weatherall, A. F. Dempsey (Hon. Sec.), and one visitor.

**HORSE COMPLAINTS.**—In reply to questions, Mr. Wetherall stated that pneumonia was generally caused by a sudden chill, but working horses with an overloaded stomach, especially when out of condition, would cause it. He advised giving fifteen to twenty drops of aconite every four hours for twenty-four hours, and would not foment unless inflammation of the bronchial tube was suspected.



Indigestion was often connected with other ailments, the dry state of the mouth, showing absence of secretions necessary to bring the food to proper condition for digestion. Bran mashes and boiled linseed act both as remedies and preventives, but in obstinate cases a good dose of salts was required. In most cases of colic the animal suffers from retention of the urine, which can sometimes be relieved by steady pressure of the hand on the anus or fundus of the bladder. Hand rubbing of the belly is also useful. Where the trouble is caused by stone, two teaspoonfuls of hydro-claret in half a pint of water should be given. With rheumatics, give the animals rest, good food, and warmth. Mr. Chapman thought occasional change of pasture, and proper feeding would give better results than medical treatment, as it was difficult to determine the exact ailments affecting the animals, and the remedies prescribed were often not readily obtainable. Other members thought it would not do to carry this out and let all diseases run their course, or they would lose most of their stock.

**EGYPTIAN MAMMOTH MELON.**—Mr. Meyers spoke very favorably of this variety of watermelon, grown from Bureau seed. It had the thinnest rind of any melon he had seen, and was a splendid variety.

### **Dawson, March 12.**

Present—Messrs. R. Renton (Chairman), C. W. Dowden, C. F. W. Just, C. H. Meyers, O. Muller, Thos. Wetherall, A. H. Warner, A. F. Dempsey (Hon. Sec.), and six visitors.

**SEED AND FERTILISER DRILL.**—This meeting was specially called to consider offer of Messrs. Norman & Co. to place a "Superior" seed and fertiliser drill at the disposal of the Branch for the purpose of testing this method of putting in the crop. After watching the machine at work it was decided to accept the offer, and to endeavor to get as many farmers as possible to have small areas put in with the drill so as to give it a thorough test on the different classes of soils in the district.

**EXHIBITS.**—Mr. Muller tabled splendid samples of Duchess pear and Royal George peach, grown on his farm at Cavenagh West.

### **Quorn, March 10.**

Present—Messrs. J. B. Rowe (Chairman), R. Thompson, James Cook, and A. F. Noll (Hon. Sec.).

**BIRD PESTS.**—Mr. Cook exhibited specimen of "silver-eye," a small bird which has been very numerous this year, and has done a lot of damage to the grape crop around North Quorn. He had shot fully 100, and his neighbors had also killed a great number, so that he hoped they would not be so troublesome next season.

**FARMING IMPLEMENTS.**—The Hon. Secretary reported on the different exhibits of farm implements and machines at the recent Adelaide Show.

### **Port Broughton, March 7.**

Present - Messrs. R. W. Bawden (Chairman), W. R. Whittaker, W. Bennier, R. Storr, B. Excell, W. Tonkin, J. Barclay, E. Dalby, J. Harford, I. Rayson, H. H. Whittle, and S. M. Bawden (Hon. Sec.).

**PRUNING AND CULTIVATION OF FRUIT TREES.**—Mr. Bennier read the following paper on this subject :—

We have a number of people at the present time who contend that pruning and cultivating is working against nature—that pruning shortens the life of the tree and cultivating destroys the roots. He thought, however the results obtained this summer in the district would convince any reasonable man that both systems, properly carried out, were distinctly beneficial to the trees. By judicious pruning the tree is kept low and shapely, the stem is well shaded, the wind has very little effect on it, while it is easy to spray the tree and gather the fruit. In a dry district like this we must grow low bushy trees. We do not want them open to let the sun in; in fact, if they are at all open the fruit is burnt. Many are opposed to top pruning, but he found that it was a great factor in getting fruit. He pruned about forty acres of trees every year, and carefully studied the results, but failed to see any ill effect of this topping. Pear trees that would not bear were made fruitful, and cherries so treated bore heavy and regular crops, notwithstanding the fact that the old residents insisted that the district was too dry for them to do. While there is no doubt a lot of harm done by abusing the practice, judicious work keeps the trees healthy and fruitful, and the fruit is larger and of better flavor.

Cultivation is most important in a dry district. Notwithstanding the drought, the orchards in this district which have been thoroughly cultivated are in promising condition, while those gardens where this work has been neglected contain many dead and dying trees. Professor Lowrie has said that thorough working of the soil is worth almost as much as 2in. of rain, and his own experience certainly bore this out. Three years ago he had half a square chain of land planted with onions, the whole being hoed occasionally to keep down the weeds. The three middle rows were, however, hoed once a week, and these produced large mild onions, while the rest were only half the size, and very strong. His experience with trees was very similar. Keep the surface soil loose, so that the dew may penetrate and the air circulate, and the trees will thrive with but little rain.

**WHEAT HARVEST.**—Members were of opinion that the average for the district would be about  $3\frac{1}{2}$  bush. per acre. The yield was reduced quite one-half by the scorching hot winds in October and November. This season a very large area will be put in with the seed and fertiliser drills, English super being the fertiliser most in demand.

### **Murray Bridge, March 12.**

Present—Messrs. F. H. Wurm (Chairman), W. Lehmann, J. J. Stecker, H. Schubert, W. Schubert, J. G. Jaensch, H. Block, B. Jaensch, J. G. Newmann, and R. Edwards (Hon. Sec.).

**ENSILAGE.**—Mr. B. Jaensch tabled sample of ensilage made from Algerian oats. The crop was so blighted in November as to render it almost useless for hay, so he cut it green, and put it in a pit made by simply excavating in hard clay soil. He was now feeding his cattle on it, to their benefit. Several members spoke favorably of the sample tabled.

**KAFFIR CORN.**—Mr. Block tabled specimen of Kaffir corn, 4ft. high, grown on his farm.

### **Mount Pleasant, March 11.**

Present—Messrs. G. Phillis (Chairman), F. Thomson, R. Godfree, H. A. Giles, W. Lyddon, W. Vigar, J. F. Miller, H. Dragomuller, P. Miller, J. Maxwell, and H. T. Hull (Hon. Sec.).

**MANURING.**—Mr. Giles reported having obtained 2 tons of hay per acre from 116 acres manured with guano, bonedust, and Thomas phosphate, wheat and oats being sown. Seventy-four acres of wheat crop was cut when turning yellow, and then thrashed with header, and averaged 16bush. of first-class grain. His horses, however, would not touch the Algerian oaten hay. Mr. J. F. Miller said his horses eat this hay just as readily as wheaten hay. Mr. Giles stated that thirteen acres of peas were also manured, and yielded four bags per acre notwithstanding the fact that they were badly cut by hot winds.

**EXCHANGE OF SEED WHEAT.**—Members reported as follows on trials with Purple Straw wheat obtained by the Branch from Tasmania. Mr. P. Miller sowed 81lbs., and reaped five and a half bags; Mr. Giles, 160lbs., reaped eight bags; Mr. J. F. Miller, 80lbs. sown, six bags reaped; Messrs. Vigar and Maxwell, 80lbs. sown, four bags reaped; Mr. Lyddon, 80lbs. sown, two bags reaped. The grain in each case was first class. The Secretary was instructed to arrange for further exchanges of seed wheat with Tasmanian growers.

**WEED.**—The Chairman stated that he had noticed the star thistle flowering near Woodside. He hoped the members would keep a sharp lookout to guard against its introduction into this district.

**BINDER v. STRIPPER.**—Mr. Morgan's paper, read at Strathalbyn, on this subject was discussed. Mr. Giles expressed himself quite satisfied to continue using the binder and header as far as practicable. Other members thought the stripper could not be replaced by the binder and header. Mr. Godfree said he had known of the headed straw causing scouring in horses.

**ENSILAGE.**—Mr. Giles stated that his ensilage experiment was satisfactory. The food was good and cows were keeping up their milk well on it.

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### Forest Range, March 10.

Present—Messrs. J. Green (in chair), G. Monks, H. Waters, S. A. Collins, J. Sharpe, J. G. Rogers, W. Cherryman, R. M. Hackett (Hon. Sec.), and two visitors.

**DRAINAGE.**—Mr. Collins read the following paper on "Draining the Soil":—

In my opinion the best way to make underground drains is to use earthenware pipes, especially where the soil is liable to wash. First choose the most suitable position for the drain, then take out the soil 2ft. to 3ft. deep, according to size of drain. Place about 6in. of broken stone on the bottom, then lay on this (in the middle) slightly damaged pipes, place broken stone for about 6in. on both sides and on top, then a thin layer of dry grass or ferns, then the stiffest of the soil, and finally filling up with the top soil. Piping suitable for this work (slightly broken or misshapen) can be bought at very reasonable rates at the pottery works, as they are of very little use. Short drains leading into the main drain can be made of broken stone without the pipe.

Mr. Cherryman would not break the stone small; the larger, in reason, the better. It should be thrown in rough and put on boughs. It was surprising how long a drain of this description would last. He had put down drains 3ft. deep and 20in. wide, taking out a narrow trench in the bottom, leaving a ledge on each side, across which slabs of wood were placed, with teatree scrub on top. Where the ground is not solid he favored draining as described by Mr. Collins. Mr. Waters agreed, but on solid ground preferred Mr. Cherryman's plan. Some slabs here and there may rot, but if split out of old timber would last for years. He knew of a piece of swamp land that the owner could not keep drained, so, having a lot of stone, he took out a drain 4ft. by 10ft. and filled it up with stone. Where no stone was available slabs 6ft. long resting on bearers were used. In places where there was not much water and the ground was firm cut drains about 3ft. deep and lay timber lengthways, one end of each timber resting on the timber above it. Mr. Green said stringybark slabs do not rot where the soil is always wet; he had some which had been down over fifteen years, and they were in good condition still. Mr. Monks said Mr. Collins's plan was good, but expensive, though it must be admitted that in some soils the dearest method was in the end the most economical. He thought for timber drains only red gum or jarrah should be used; drains made of red gum thirty years ago were still acting. In reply to questions Mr. Collins said the surface of the drain should be at least a foot

below the soil to allow cultivation to go on uninterrupted. Damaged pipes can be obtained very cheaply; the pipes should not overlap. Where a pipe was chipped the hole should be covered with a flat stone; branch drains should be about a chain apart. In very wet places it may be necessary to put large stones under pipes to make a firm bed; branch drains may be made of 2in. or 3in. pipes, decreasing according to the state of the land; the stones keep the silt out of the pipes, and do not encourage the roots to penetrate. Pipes put down with protecting layer of stones become stopped with roots.

**KAFFIR CORN.**—Mr. Monks reported having sown White Kaffir corn in October, half in drills and half broadcast. Considering the excessive dryness, the plants have stood remarkably well, having received no further attention than the pulling up of a few weeds. The plants are still green and fresh, and from the many stools in each plant he believed in an ordinary season would make a splendid fodder. Other members also reported favorably on this plant.

### **Riverton, March 5.**

Present—Messrs. H. A. Davis (Chairman), T. Gravestock, A. Hannaford, M. Andrew, H. A. Hussey (Hon. Sec.), and one visitor.

**DISTRIBUTION OF PESTS.**—The Hon. Secretary reported having found a caterpillar in the core of an apple grown in the district. He intended to hatch it out, but unfortunately it escaped. The local inspector, Mr. Andrew, promised to inspect the garden and report. Mr. Gravestock called attention to the suggestion by Coonawarra Fruit and Vinegrowers' Association that empty fruit cases should be disinfected by means of steam at the railway stations. Members strongly support the action taken by this association and the Central Bureau, as they feel that it is absolutely necessary that all practicable precautions should be taken against the spread of the codlin moth and other pests to districts now free.

**WEED.**—The Hon. Secretary called attention to the spread of *Linaria clatine* in the local railway station yard, owing to its being cut up after seeding. It makes its appearance about November, and must be cut up before February. It is also spreading in the fields between Tarlee and Stockport, and unless dealt with in a vigorous manner will become as great a pest as stinkwort.

**RAINFALL.**—Recorded for February, 1·070in.

### **Lyrup, March 8.**

Present—Messrs. A. Pomroy (Chairman), E. J. Dwyer, D. Thayne, W. Healy, W. H. Walling, A. Weaver, E. Layton, A. Thornett, F. E. Chick, P. Brown, T. R. Brown, D. J. Bennett, T. Nolan, W. H. Wilson (Hon. Sec.), and five visitors.

**ANNUAL REPORT.**—The Hon. Sec.'s annual report showed that during the past year twelve meetings were held, with an average attendance of ten members and several visitors. Papers on "Dairy Cattle," "Pruning," "Laying Out the Orchard," and "Alkali Soils and their Treatment" have been read and discussed. Numbers of experiments with seeds received from the Central Bureau have been conducted, and satisfactory results obtained with grasses, vegetables, &c., and in this direction the thanks of the Branch are due to Mr. Pomroy for the careful manner in which he has tested various seeds handed over to him. Mr. A. Thornett was elected Chairman and Mr. W. H. Wilson re-elected Hon. Sec. for ensuing year.

**EXHIBITS.**—Mr. Thayne tabled splendid specimen of Cuban Queen water-melon weighing 31lbs., of excellent quality, and with very thin rind; the vine producing this was transplanted when the runners were nearly 2ft. long. He had also had some good fruit of Hungarian honey melon; these were small, but of fine flavor. Mr. Nolan tabled specimens of red and white dhurra, 4ft. 6in. and 5ft. high. He had some plants of the latter quite 10ft. in height, and very heavily flagged. Mr. Skelton, a visitor, stated they could get three cuttings from the white dhurra. He also stated that he was making sweet stack ensilage from plants of "Paddy melon" and grasses grown on flooded land, and believed it would turn out well. Some discussion took place on question of sowing grasses on the box flats.

**RAINFALL.**—For February, 1·470in.

### **Maitland, Match 5.**

**Present**—Messrs. C. F. G. Heinrich (Chairman), W. Wilson, J. Kelly, C. E. Moody, Thomas Bowman, John Hill, and C. W. Wood (Hon. Sec.).

**MANURING.**—Several reports were received from farmers who have used seed and fertiliser drills, and some discussion followed. Members were of opinion that, notwithstanding that the season was so very dry, the new departure had paid handsomely. Great dissatisfaction was expressed at the state in which Adelaide firms are delivering superphosphate, many farmers receiving quite 10 per cent. short of the weight they have paid for.

**BUNT.**—A long discussion took place on this subject. All the crops were greatly affected last season. Most members promised to try both lime pickle and the ordinary bluestone pickle, and report next season.

### **Mount Bryan East, March 5.**

**Present**—Messrs. T. Best (Chairman), H. Wilkins, J. Prior, W. Bryce, R. Webber, and W. H. Quinn (Hon. Sec.).

**SEED EXPERIMENTS.**—Mr. Wilkins reported having sown a small plot of cow peas, but only a few germinated, and these had only done fairly well. He had also succeeded in raising some very fine watermelons.

**SEED DRILLS.**—Considerable discussion took place on the seed and manure drills, members being of opinion that they could be used with advantage in this district.

### **Angaston, March 19.**

**Present**—Messrs. R. Player, E. Thamm, F. Salter, A. Friend, J. Vaughan, P. Radford, A. Sibley, W. Sibley, and E. S. Matthews (Hon. Sec.).

**ZANTE CURRANT.**—Mr. Radford read the following paper on this subject:—

The principal thing in connection with proper growing of currants is to select a well-sheltered situation, the Zante doing much better if protected from north and west winds. They do well on a rich sandy loam, which holds the moisture better than stiffer soils. In planting I think the distance should generally be 10ft. between the rows, but on richer ground 16ft. to 24ft.

I prefer a low trellis to a high one, as it is not so likely to catch the wind, posts to be 4ft. 3in. high, and 26ft. to 28ft. apart; trellis to consist of three wires, the first 12in. from the ground (except in frosty districts), the centre wire 16in. above the bottom one, and the top wire 20in. above the middle wire.

Our vines bear well by leaving a rod and spur every 12in. to 14in., the spur being left for rod the following year, as the rods do not always make enough wood below the bend for next year's rods. I have taken two to three kerosine buckets of currants off one vine pruned this way this season.

I pruned two or three vines by tying them up to top wire, but I find this did not answer so well, as the sap going to the end of the rod makes a lot of wood instead of "bursting" and setting fruit evenly. I believe in ploughing the ground twice, the first ploughing to be given early in the winter to a depth from 6in. to 8in., and to be ploughed away from the rows, so as to allow the winter rains to soak in; the second ploughing to be from 3in. to 4in., and thrown towards each row, so as to keep the roots well covered from the power of the sun.

Considerable discussion ensued, there being some difference as to best method of trellising. All were agreed that there was a profitable future for the currant industry.

**LEMONS.**—Members wished to know best time to plant lemon trees where no summer irrigation is possible. [As early as possible in the autumn after the first rains and before the ground gets cold, or late in spring, when the land begins to get fairly warm.—GEN. SEC.]

### Woolundunga, February 15.

Present—Messrs. T. H. Prosser (Chairman), J. H. Michael, J. Dunn, H. Aldenhoven, J. Grunike, N. Rogers (Hon. Sec.), and one visitor.

**BIRD PESTS.**—It was suggested that the Central Bureau should endeavor to have it made part of the duty of the codlin moth inspectors to see that the sparrows were being destroyed as this could be done with but little extra trouble and expense. Some members considered silver eyes and crows quite as destructive as sparrows, and that these should be included in the list of destructive birds.

**LUCERN.**—Mr. Grunike tabled sample of lucern 18in. high, being three weeks' growth since cutting, and making the fourth cutting since September.

**FARM GARDENS.**—Mr. Dunn read a paper on "The Garden as an Improvement to the Farmhouse," of which the following is the substance:—

Probably all of us have been struck by the number of bare and unprotected farmhouses throughout the North, and that in country capable of growing forest and fruit trees. Everyone should make an effort to grow some trees round the homestead, but the absence of direct profit prevents many from growing ornamental trees. A fruit and vegetable garden is a matter of direct profit if looked after, and in choosing the site for the homestead, some attention should be paid to the character of the soil, as it is better to be a little further from the road, on land suitable for gardening, and near to where water is obtainable, than to have the garden quarter of a mile from the house. The surface floods can be utilised to good purpose with a little care. Plant only as much as can be properly attended to, and in order to economise labor in cultivating plant on the square with plenty of room between the trees. Find out from those around you what trees do best in the district, and plant mostly of these. Where water is not plentiful do not plant trees requiring a lot of water. It may be said that the seasons are too dry, but with proper care the trees will keep alive through the droughts and flourish in the average seasons. We have plenty of well-established gardens here as a proof of this. There is, no doubt, that the Agricultural Bureau has done a lot towards helping people to make their homes more comfortable and attractive, and there are many gardens in the North in existence which would never have been planted but for the interest worked up by the Bureau. More people understand a little about gardening now than was the case a few years ago, and want to know still more. They had a lot to learn yet, and the best way to learn it was by helping one another with the results of their experiences.

Considerable discussion followed, and afterwards members inspected Mr. Michael's garden, farm buildings, stock, &c., all of which are kept in good condition.

### Finniss, March 7.

Present—Messrs. A. Willcock (Chairman), T. R. Sumner, A. E. Henley, W. W. Heath, W. T. L. Heath, and one visitor.

**FRUIT-GROWING.**—Members were of opinion that there were not sufficient apples grown in the district to induce them to go in for exporting. This

meeting was held at the residence of Mr. W. W. Heath, whose garden was inspected by the members. Notwithstanding the drought the trees all look green and healthy. A visit was also paid to an adjoining section, where a party of Chinese have about twenty acres under tobacco. The plants are in splendid condition, and members were pleased with the very promising prospects of the crop.

### **Mount Gambier, March 12.**

Present—Messrs. J. Umpherston (Chairman), J. C. Ruwoldt, J. Bowd, J. Dyke, J. Watson, M. C. Wilson, W. Mitchell, T. H. Williams, and E. Lewis (Hon. Sec.).

SEASON.—In connection with the Conference of Branches, to be held at Bordertown on March 16, several members stated that owing to the severity of the season their products generally were too inferior to be worth showing.

STOCK COMPLAINTS.—Stock Inspector Williams reported that there were still a good many deaths of cattle occurring from impaction and from inflammation of the bladder and kidneys. The latter was due to the bad condition of the water in the waterholes, &c. He had made an examination under the microscope of matter obtained from a beast which had died from inflammation of the kidneys and of the water from which the beast had been drinking, and found the same bacteria in both. He strongly advised stockowners to use molasses with the straw and grass hay, and to give the animals salt and sulphate of iron in the water, and to see that the water was good. The Chairman said he had been mixing molasses with an equal quantity of water, then sprinkling the straw with the liquid, and his stock were doing well on it.

### **Onetree Hill, March 4.**

Present—Messrs J. Bowman (Chairman), F. Bowman, A. Adams, F. L. Ifould, A. Thomas, and J. Clucas (Hon. Sec.).

RAINFALL.—Mr. Kelly reported rainfall recorded for week ending March 1st, at his homestead, was 1.300in. The fall towards Gawler was heavier.

STOCK COMPLAINTS.—Mr. Adams reported having lost all his cows from some complaint causing stiffness of the jaws and frothing at the mouth. Members stated that ophthalmia was prevalent amongst the cattle in this district. [For ophthalmia bathe the eyes twice daily with 4oz. tincture of opium in a quart of water. - GEN. SEC.]

KAFFIR CORN.—Messrs Kelly and Ifould reported favorably on Red and White Kaffir corn obtained from the Central Bureau. The Chairman stated that he planted his in dry sandy soil, but it failed.

THATCHING.—In discussing matters of interest in connection with meeting held at Mr. F. Bowman's residence, reference was made to the use of the grass tree for thatch. Mr. Bowman explained how it was utilised, and stated that the thatch lasted good for ten years.

### **Stockport, March 19.**

Present—Messrs. F. Watts (Chairman), C. W. Smith, S. Smith, G. Burdon, S. Rogers, T. Megaw, D. G. Stribbling, and J. Murray (Hon. Sec.).

DEPTH TO SOW WHEAT.—Considerable discussion took place on the depth to sow wheat, members being generally of opinion that best results were obtained by sowing about 2in. deep.

**Balaklava, March 12.**

Present—Messrs. C. L. Reuter (Chairman), W. H. Sires, W. H. Thompson, J. Mills, E. Roberts, J. Vivian, A. Manley, G. Reid, A. Steinwedel, E. M. Sage (Hon. Sec.), and one visitor.

**MANURING.**—Mr. Steinwedel said his remarks *re* use of guano had been misunderstood. What he said was that he would sow guano broadcast on the fallow when preparing it for the seed, and not at time of ploughing up for fallow. Mr. Roberts reported having last season summer-ploughed eighteen acres cropped the previous year, after being out for eight years, scarified it with a Planet Jr., and harrowed it once. The land was sown with drill, half with  $\frac{1}{2}$  bush. of White Tuscan wheat, and the other half with  $\frac{1}{2}$  bush. to the acre. On one acre through the centre 1cwt. of colonial super was drilled in with the seed. The whole was put in during the first week in April. In August the manured portion was about 4in. higher than the rest, but the whole crop was blighted by the hot winds, and the manured portion yielded very little better than the other. Where the smaller quantity of grain was sown the wheat stood out much better, there being from eight to ten stems to each plant, against only four to six on the others.

**Pine Forest, March 8.**

Present—Messrs. W. H. Jettner (Chairman), D. F. Kennedy, J. St. J. Mudge, A. Mudge, W. Wurfel, J. Flowers, J. Muller, J. Phillis, E. Masters, F. Inglis, R. Barr, jun. (Hon. Sec.), and J. Barclay, J. Harford, and A. McCarron, of Port Broughton Branch.

**CONFERENCE.**—Considerable time was devoted to matters in connection with the Conference of Branches to be held at Alford on March 23.

**SHEEP.**—The Chairman read an interesting paper on "The Management of Sheep."

**MANURING.**—Mr. Harford gave an instructive address on chemical manures, explaining the requirements of the plant and the constituents of the various manures.

**Woolundunga, March 15.**

Present—Messrs. J. Grunike (in chair), F. A. Sells, J. H. Michael, W. White, W. McLaren, H. Johnston, H. Aldenhoven, and one visitor.

**EXHIBITS.**—Mr. Aldenhoven tabled splendid sample of Golden Eagle free-stone and yellow Italian clingstone peaches. He also stated that squashes raised from Bureau seed had done well.

**GARDENING.**—Mr. Grunike read a paper on experiences of gardening, of which the following is the substance :—

I started gardening in this district five years ago, the soil and situation being good, and the water supply ample. The trees—orange, lemons, apricots, and peaches, were planted on the square, 22ft. apart, and all got a good start. With good cultivation and plenty of water they have done well each year until this summer, when I have had the mortification of seeing many of my trees, which I thought well established, wither away before the blasting north winds, which swept across the district week after week, and I am forced to the conclusion that it is impossible to raise fruit trees on a large scale except in places naturally well protected from hot winds, or where thoroughly effective wind-breaks can be grown. I consider I made a great mistake in planting the trees so far apart. They would have done better at 12ft. by 16ft., as both labor and water would be economised. To carry the trees through our long dry summers, the whole garden must be flooded periodically, and this can be done best where the trees are on a smaller area and closer together. Watering by means of a hole or pit round the trees is insufficient. I have had much better success with vegetables than with fruit; peas, tomatoes, cucumbers, and onions doing very well, and being readily disposed of. It is, however, useless to attempt to grow these unless you have an abundant and permanent supply of



water. About the most profitable thing to grow here is green fodder in the summer, as nearly everyone has a good market for it, *i.e.*, for feeding his stock. Sorghum and lucern do well with plenty of water, and 20 to 30 tons per acre can be obtained. From the results of my own experience, I would strongly advise those residents going in for intense culture to grow things that do not require much capital to begin with, things that give a quick return, and for which there is a good local market.

Members generally agreed with Mr. Grunike. There was, however, some difference of opinion as to the distance apart the trees should be planted, but the majority considered 12ft. to 15ft. apart quite sufficient in this district. Mr. Aldenhoven stated that in February he planted some sorghum, which was well above ground within forty-eight hours.

### **Inkerman, March 8.**

Present—Messrs. S. Diprose (Chairman), E. M. Hewett, D. Fraser, W. Fraser, C. H. Danial, R. Kennedy, W. Board, and W. A. Hewett (Hon. Sec.).

**SORGHUM.**—Mr. Fraser reported that his plot of sorghum was standing the drought well, and he believed it would grow all right in this district in an ordinary season. Other members stated their plants had died from want of moisture.

**MANURES.**—Mr. Hewett stated that he had seen it reported that superphosphate gave best results on clay land and Thomas phosphate on light sandy land, but that neither paid on limestone. [Like many other statements made by people who professed to know, this is absolutely incorrect in regard to effect of manures on limestone soil, as anyone who reads of the results of the use of these manures on the Peninsula will at once admit. Superphosphates will give better results than Thomas phosphate on sandy soil, and Thomas phosphate will do well on heavy clay soil. See reports in same issue on "Experiments with Manures."—GEN. SEC.] Mr. Board thought it was a mistake to put the manure with the seed. If placed a little way away the plants would get the fullest benefit when coming to maturity. He had at least proved this with cabbages, as they gave him best results when the manure was put in trenches midway between the rows. The Hon. Sec. asked whether it was true that Kangaroo Island guano put in with the seed has an injurious effect if rain does not fall soon after sowing. [No; there is nothing in the guano that could have any such effect.—GEN. SEC.]

**ECONOMY OF LABOR.**—Mr. E. M. Hewett read a paper on this subject, with illustration. Considerable discussion followed.

### **Renmark, March 19.**

Present—Messrs. H. Showell (in chair), W. H. Harrison, H. Fetch, E. Taylor, A. L. Acason, W. J. Moffatt, R. Kelly, and W. H. Waters (Hon. Sec.).

**ALKALI SOILS.**—The report of the village settlements expert on the cause of the death of fruit trees on the settlement was read and discussed, and the hope was expressed that the Government would carry out his recommendation to have the soils tested for alkali. Members wished to know the relative percentages of alkali in the ashes of lemons, apricots, and pears, respectively.

### **Koolunga, March 3.**

Present—Messrs. J. Sandow, J. Button, W. T. Cooper, R. Jackson, E. J. Shipway, J. Butterfield, J. Freeman, W. Ballinger, and G. Pennyfield (Hon. Sec.).

**SEED DRILLS.**—The Chairman reported that a very satisfactory trial of seed drills was held on February 18. The land was selected with a view to test the

drills on stony soil. There was a large attendance of farmers, who were well satisfied with the work performed by the drills.

**SHEEP.**—The Hon. Secretary read a paper written by Mr. G. Maslin, and read at another Bureau meeting. Mr. Maslin strongly recommended the Shropshire sheep for farmers.

**TICKS.**—Mr. Shipway reported prevalence of ticks on fowls. He found that the application of a mixture of kerosene and oil got rid of the pest.

### Yorketown, March 19.

Present—Messrs. T. Corlett (Chairman), C. Domaschensz, and J. Davey (Hon. Sec.).

**WHEAT EXPERIMENTS.**—Mr. Carlett stated that he had had splendid results from Dart's Imperial wheat, received from Central Bureau. He had enough seed to plant four rows, each about 8ft. in length, and owing to the season scarcely expected to get more than seed back, as it was not sown till end of June. It grew splendidly, reached a height of 3ft., had fine, long, well-filled heads, and stood the dry weather well. He gathered 15lbs. of grain, a little pinched, but still a good sample.

### Richman's Creek, March 21.

Present—Messrs. A. Knauerhase (Chairman), J. J. Searle, W. J. Wright, J. J. Gebert, P. J. O'Donohue, and J. McColl (Hon. Sec.).

**EXPERIMENTS.**—The Hon. Secretary reported on the following experiments tried on their farm during 1897. *Cereals*: In the wheat crop on the farm African Bearded yielded best, averaging 7bush., against Allora 5bush. and Red Straw 3½bush. In the experimental plots one acre sown with 28lbs. Carmichael's Eclipse returned 4bush.; 27lbs. selected African Bearded on three-quarters of an acre returned 3bush. 54lbs.; Red Straw and a variety from Mount Gambier were very much blighted. In a strip of rich soil running right through the plots the wheat was blighted, but not to any extent with the first two varieties. In smaller plots, out of nine varieties African Bearded proved best, and Dart's Imperial next. The latter has large fine ears, but ripening late was not so well filled. It would do better if sown earlier. *Sorghum*: Four varieties were sown—Red Kaffir Corn, Amber Cane, Planter's Friend, and a variety grown in the Far North. The latter was the only one that had seeded. The others were, however, still alive. *Saltbush*: Two varieties of perennial saltbushes were sown, but one never came up. A few plants of *Atriplex holocarpa* came up, and went to seed in a short time, and are now quite dry. *Fertilisers*: Small quantities of kainit and Thomas phosphate were received from Mr. F. H. Snow, but were not a success, the failure being due to small rainfall.

**BUNT.**—The following question was asked: Would washing remove the bunt from wheat, and, if so, would it injure the wheat for seed? Members thought most of the bunt could be removed by washing, and if the seed is dried again before bagging it would not be injured. Mr. Wright said he pickled his seed in a trough which held about three bags. He emptied the seed into the bluestone water, and turned it over well with a shovel. The Hon. Secretary said he used a cask, dissolving the bluestone by suspending it in the water in a piece of bagging. He put about a third of a bag of seed in a branbag, and by means of rope and pulley he was able to pickle ten bags in an afternoon by himself.

**RINGWORM IN HORSES.**—Mr. Searle wished to know remedy for ringworms in horses. [Shave the hair as closely as possible from the affected patches and paint with tincture of iodine.—GEN. SEC.]

**Minlaton, March 26.**

Present—Messrs. J. Martin (Chairman), W. Correll, H. Boundy, J. McKenzie, S. Vanstone, J. H. Ford, and Joseph Correll (Hon. Sec.).

**HARES.**—Some discussion took place on the mischief wrought by hares in the gardens and vineyards and on the best means of coping with the pest. [Wire netting is very cheap, and as farm gardens are not generally extensive, therefore this would be the cheapest, most durable, and most effectual preventive of damage by hares, rabbits, and *poultry*. To prevent fowls flying over the fence, stretch a *thin* wire about 7in. above the top of the fence. The hens cannot see this from the ground, and they always try to just clear the top of the fence, with the result that they strike the wire and are thrown back. They will not try more than twice or thrice to get over the fence.—GEN. SEC.]

**SUBSOILING.**—The article in the March issue of the *Journal of Agriculture and Industry* on "Deep v. Shallow Ploughing" was well discussed. Mr. McKenzie agreed that farmers should try experiments to test the benefit of subsoiling for wheat crop. The Hon. Secretary said he was more than ever convinced that on suitable soil the use of the subsoil plough would be profitable.

**THICK V. THIN SOWING.**—This subject was also discussed, but no decision arrived at. The Hon. Secretary, however, strongly favored thorough preparation of the seed bed, and more thin sowing than usual. [Members with seed drills should carry out experiments to test this matter for themselves. There would be very little trouble or expense in putting in acre plots with different quantities of seed.—GEN. SEC.]

**MANURING.**—The Hon. Secretary said there was an error in the latest report (page 663, of March *Journal*) in regard to effect of manuring with muriate of potash. What he said was that in his opinion the crop was better than it would have been *without* the potash, and not the reverse as stated in the report.

**Penola, March 19.**

Present—Messrs. D. McKay (Chairman), E. A. Stoney, J. W. Sandiford, S. B. Worthington, D. Bahnave, W. Miller, J. A. Riddoch, H. Ricketts, J. Fowler, W. R. Pounsett, Dr. Ockley, T. H. Artaud (Hon. Sec.), and about twelve visitors.

**COONAWARRA FRUIT COLONY.**—This meeting was held at Coonawarra at the invitation of Messrs. Riddoch and Fowler, members and visitors inspecting the winery and other buildings before the business of the meeting was commenced. The operations of wine-making were watched, and afterwards a number of the fruit blocks were inspected. With one or two exceptions the blocks are in a high state of cultivation and a credit to the Coonawarra colony.

**LOCUSTS.**—Mr. Stoney said the arsenic, sugar, and straw remedy for locusts was quite useless for the protection of orchards, as the pests would not touch the chopped straw as long as ripe peaches and succulent leaves were available. He had tried the American remedies of arsenic, bran, syrup, &c., sugar and arsenic painted on damaged fruit, spraying with tobacco-water, and also sulphuring without any effect. He would like to know whether the growing of a few castor oil plants or larkspurs would be of any practical value, and if so to what extent should they be cultivated.

**SOUTH-EASTERN CONFERENCE.**—The Hon. Sec. read a long report on the proceedings of the Conference at Bordertown on the 16th March, and on the collection of exhibits sent from Penola Branch. In all he took with him 147 exhibits. [Further particulars will be found in a report of this Conference appearing in another portion of the present issue of the *Journal of Agriculture and Industry*.—GEN. SEC.]

## BREEDING SOWS.

The sow at farrowing should be in good flesh, but not too fat. A week or ten days before farrowing she should be confined to a pen separate from the other pigs and in a quiet place. Her keeper should take the time to go into the pen and fondle her so as to gain her confidence. During these few days she will become acquainted with her quarters, and will feel secure from outside intruders (says a writer in the *American Swineherd*). If he goes in the pen often she will soon be glad to see him, for like any other animal the pig likes company, and gets lonesome when left too much alone.

There is no animal that has been domesticated that is more intelligent and tractable than the well-bred pig. When she is about to farrow she will begin to fix up by making her bed in proper shape. To this end give her clean quarters on a dry floor, with short straw; long coarse bedding has been the death of many a pig. If the weather is cold it will pay to watch her close by night and day, and if liable to chill take the young pigs as fast as they come to a warm room and give them a little warm milk with a spoon; then when the dam has got over her sickness take them to her. Scratch her on the udder, and place the little fellows where they can get warm, and they will go to work in earnest.

When the weather is not cold she will get along just as well if left alone. If she is very sick, in which case she may be up and down a great deal, it is necessary to take a part of them away to save them from being overlain. After farrowing keep her warm and feed a very little warm thin slop for the first few days, and after that increase each day until she has all she will eat up clean, three meals a day.

## THE VALUE OF HUMUS.

### Its Functions, and how it is Made.

A recent bulletin of the Minnesota Experiment Station discusses humus, and draws the following conclusions:—

The animal and vegetable substance in the soil in varying degrees of decay or decomposition are collectively spoken of as humus, or organic matter. These substances when they reach the proper stage of decay unite chemically with the potash, phosphoric acid, and lime of the soil, forming compounds called humates.

Humus has been found to be valuable in the following ways:—

1. It absorbs or "fixes" nitrogen, thus preventing the loss of this, the most valuable of all fertilising elements.
2. It absorbs water, thus enabling the soil to better withstand droughts.
3. It renders potash and phosphoric acid soluble, so that they can be taken into the sap of plants through the roots.

For these reasons farm manures possess an advantage and value over and above the market price of the nitrogen, potash, and phosphoric acid they contain. Their bulk is mostly humus, a valuable material which exists in very small quantities in commercial fertilisers.

For the same reason, clover, peas, and other green crops—even weeds—turned under are largely beneficial to land, aside from the nitrogen they have gathered from the air and the phosphoric acid and potash their long roots may have brought up from the subsoil.

### Things that Produce Humus.

Investigations prove the following interesting and valuable facts relating to humus:—Farm manure, green clover, blood, fish, tankage, cotton seed, &c., produce humus rich in nitrogen; while oats, straw, sawdust, and carbonhydrates form humus poor in nitrogen, but rich in carbon, and the nitrogenous humus more readily unites with the potash and phosphoric acid of the soil to form humates than does carbonaceous humus. The humus of virgin soils is much richer in nitrogen and humates than the humus of soils that have been cropped for a series of years.

The practice of burning off lands preparatory to ploughing often permanently injures their crop-producing powers.

Clean culture to hoed crops tends to exhaust soils of their humus, and this is why the old cotton fields of South America became so poor. It has been found that the growth of clover, cow peas, &c., soon restores these lands to a high degree of fertility, if all needed potash and phosphoric acid be applied to the clover and pea crops.

Soils most in need of humus are sandy and sandy loam soils that have long received clean culture without the application of farm manure. Mucky, peaty clay and prairie soils do not need humus for many years after they are put in cultivation. An ordinary prairie soil needs no humus added for about ten years after it is first put in cultivation.

### A QUESTION FOR THE PUBLIC CONSCIENCE.

(*New Age.*)

“While the Duke of Westminster—of all people—is begging for the war-driven, outcast inhabitants of Thessaly he and we all might well look round us nearer home and consider the conditions under which so many of our London neighbors live—leaving neither the one nor the other shut out from our effective consideration. While we all look anxiously to the conference of employer and employed engineers for at least a temporary way out of their difficulty, until they learn the method of labor association, there is a condition of life far lower, far more degrading, far less worthy the name of ‘life’ at all. It must be that English men and women do not know; they would never be so cruel as they must be if they did know of the human beings near them, and allowed them to live on as they do. ‘Rank behind rank stand masses of helpless women, generally too poor and ignorant to organise, to struggle, or even to remonstrate; mere slaves to the imperious necessity of starvation wages—jammed between famine and the workhouse.’ A new inquiry has just been made by the Women’s Industrial Council into the condition of about 400 London women who earn money by working at home. A writer in a contemporary summarises the inquiry thus: “Of these 400 women, taken as they came without special selection, about nine-tenths were found to belong to sixteen different regular small trades, viz., brushes, umbrellas, matchboxes, beads, sacks, tailoring, shirt-making, fur-pulling, &c. Of these the umbrella-makers earn the most—from 2s. 6d. or 3s. a day to 5s. a week, while deductions run to 9d. a week. At the lowest end of the scale come the fur-pullers—a deplorable tribe. No woman takes to this who is fit for anything else, and those who are driven to it by necessity are anxious to conceal the fact from the prying eyes of the world. These women live in the utmost poverty and filth in the back kitchens and attics of tenement dwellings in noisome courts and alleys. They work, eat, and sleep in an atmosphere thick with impalpable hairs, and tainted with the sickly smell of the skins. They earn about 1s. 1d. a day, and 4d. per week must be deducted for knives, etc. There is little difference in their condition or circumstances; all have sunk

to the lowest depth of squalor and misery. They suffer from chronic asthma, and of course the rate of infant mortality is high. Read for yourselves if you dare, all the rest, and then remember, you with your flowered heads, and you who 'make haste to be rich,' that these women are probably not very distantly related to you; the children of those who have sunk as we may see others in process of sinking now. The process begins sometimes very near the court, and then a few hidden generations and they are down—will-less, abject, in the very mud of humanity. Let us see that we do not move a finger that will help to increase the numbers of this 'deplorable tribe.' "

## MARKET GARDENING.

(*New Age.*)

"That part of the holding of a farmer or landowner which pays best for cultivation is the small estate within the ring fence of his own skull." So at least thought Charles Dickens, but as he was only one of the "writing fellows," and not a practical agriculturist, his views on the land question seem to have been regarded as altogether Utopian. We are bold to confess, however, that we think Dickens was right. Let the farmer begin with the tillage of his brains and "it shall be well with grain, roots, herbage, forage, sheep, and cattle. They shall thrive and he shall thrive." . . . . A recent number of the *Journal of the Board of Agriculture* affords ample evidence of the fact that the foreign producer has successfully adopted the plan which Dickens recommended, and that is the chief reason why he has become so formidable a competitor with the British farmer in our home markets. In an article on "Market Gardening," the writer shows how, even in this department, foreign competition is becoming increasingly serious. It must be admitted that, as regards market gardening, remarkable results, due to intelligent observation and the adoption of improved methods have been obtained by home producers with so much success that the area of this kind of small culture has doubled in England within the last twenty years. But in face of the facts brought to light by the Agricultural Department the necessity for still further improvement is apparent. There is no reason, however, for the British grower to despair. Foreign competition has been met in the past in one important respect. The volume of imported potatoes has enormously decreased of late, and the character of the trade has entirely changed. English and Scotch growers, in fact, have succeeded in producing far better "taters" than the foreigner can produce, and our imports of these dainties have accordingly declined very rapidly since 1880, and they are now almost exclusively limited to the very early kinds sent to us in the spring from the Canary Islands, the Azores, Malta, Spain, and the south of France. In the struggle to hold his own against the foreigner, however, the British market gardener is unfairly handicapped, not only by high rents and excessive railway rates, but by antiquated restrictions and various other impediments imposed by successive Parliaments of landlords for the benefit of their own class.



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[A NEWSPAPER] VOL. I.

### NOTES AND COMMENTS.

The weather during the past month has been seasonable throughout the Lower and Middle North and South, but the country north and east of Petersburg is still suffering from drought. In many cases things are looking serious, and unless soaking rains come soon there will be but little prospect of a payable crop, and stock will again have to be removed to fresh pastures. The following totals of rainfall for April, up to 28th, will show the extent of the fall:—Hawker, 0·590in.; Quorn, 0·800in.; Carrieton, 0·750in.; Petersburg, 0·870in.; Port Germein, 1·460in.; Port Broughton, 1·650in.; Laura, 1·960in.; Kadina, 2·140in.; Maitland, 2·700in.; Minlaton, 3·000in.; Burra, 1·550in.; Eudunda, 1·780in.; Morgan, 0·500in.; Mannum, 1·770in.; Riverton, 2·300in.; Angaston, 2·500in.; hills districts near Adelaide, 4·500in. to 7·000in.; Willunga, 4·250in.; South-East, 2·000in. to 3·150in.; West Coast districts, 1·500in. to 2·150in. It will be seen from these figures that seeding operations over the greater part of the farming districts have commenced under favorable conditions. In all parts considerable areas will be sown by means of the seed and fertiliser drills, and in many districts from 50 to 75 per cent of the land will be put in in this way.

Of all plants used for binding drift sand on the coast, nothing has been of so much use as Marram Grass (*Psamma arenaria*). This grass is very harsh, but during the winter months affords a certain amount of fodder for stock. In no place in Australia has its beneficial effect been so marked as at Port Fairy, Victoria. In South Australia great success has been obtained at Corney Point and Normanville. The best time to plant the roots is from the beginning of May to the middle of July; the earlier the better. Roots can be purchased at a reasonable rate from the borough ranger, Port Fairy, Victoria, and probably also from Mr. G. H. MacMillan, Normanville.

In many parts beyond the effect of the sea breezes there are areas of drifting sand which cause great trouble and damage to valuable land adjoining. More often than not the trouble is first brought about by destruction of the natural herbage, through over-stocking, cultivation, and other means. A lot could be done by landowners, at comparatively small expense, by fencing off the sand patches and planting suitable trees and plants. Amongst trees which will grow on these sand patches, and may be utilised for food, the Tamarisk, *Myoporum*,

Casuarina, Bamboo, and others may be planted. Marram Grass, Couch Grass, Buffalo Grass, *Elymus arenarius*, and other grasses, and in hot districts the various saltbushes can be grown. Anything that is done in this direction must be protected from stock for at least two years, or the plants will have no opportunity of getting a hold.

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Children are not the only human beings who cannot appreciate their truest and best friends. Many cultivators can see nothing good about the common crow, and would exterminate the whole of the species were it within their power. And yet the crow is one of the best of the friends of the farmer, the fruitgrower, and the pastoralist. Watch a flock of crows when the locusts are about, from the time the insects appear emerging from the egg cases until they die of old age. The crows even dig up the locust eggs by bushels, and eat them. They are eating grubs, caterpillars, and mature insects from dawn till dark all the year round. They must eat in order to live, and as they are much larger than tom-tits they require a deal of food. They like eggs, and will even destroy lambs sometimes, or eat fruit, but they pay well for this by work in other directions.

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Professor A. J. Perkins, Government viticulturist, has made use of cheap angle-iron posts and annealed wire for trellising vines at Roseworthy Agricultural College. The work has a remarkably neat and substantial appearance, and the professor claims that iron is much cheaper than any purchased wood can be. Iron possesses the advantages of permanency, immunity from "white ants" (termites), and fire. The native Cypress pine (*Callitris robusta*) and jarrah are seldom if ever attacked by termites, which, in land that was formerly occupied by scrub, are so very destructive to vines and trees that have not been raised *in situ* from seeds—otherwise, such that have been transplanted.

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The restriction imposed in the Australian colonies on the importation of fruit affected by insect pests and fungus diseases has come in for much adverse comment at the hands of the importers of fruit. When, however, it is remembered that in South Australia we are free from some of the most troublesome pests common in the other colonies, it must be admitted by all reasonable men that such restrictions are necessary in the interests of our important fruit growing industry. An instance occurred during April showing the necessity for the inspection of all fruit imported into our colony. A consignment of oranges from Queensland for Broken Hill was sent in ordinary open cases, and on arrival at Port Adelaide the inspector noticed that it was badly infested with scale insects, this fact being readily noticeable without opening the cases, the oranges not being wrapped in paper. On examination the fruit was found to be infested by two insects not existent in this colony—the lemon mussel scale and the purple round scale, and the young larvæ of the latter were in active motion on the fruit. The fact that the Queensland fruit fly has been found in Sydney on bananas, pine-apples, and oranges emphasises the necessity for strict inspection, even though it may cause some inconvenience to the importers.

Queensland is the last of the Australian colonies to adopt regulations to prevent the introduction into the province of diseased plants and fruits. The regulations in that colony provide that all parcels or packages of trees or plants imported must have plainly marked on them the place where the said plants



were grown, and the consignee or agent must give written notice within twenty-four hours of arrival of such trees or plants. These are then subjected to inspection, and if found infected with any disease not known to exist in the colony, they will be at once destroyed. If free, or affected by disease existent in the colony, they will be disinfected by the officers of the department. The consignee must pay cost of inspection and disinfection. Vegetable, cereals, and fruits are excepted from these clauses. The regulations also provide for the registration of all nurseries in the colony, and for the inspection by the officers of the department twice a year of all such nurseries, the officers to issue to the owner a certificate if found free from disease. If disease exists the owner must take such action as may be ordered to clean his trees or plants. It is also provided that the nurseryman must give to every purchaser a guarantee that the nursery is duly registered and certificate that the trees, plants, or vegetables have been disinfected, and that they are free from disease and healthy and vigorous in condition. No person is allowed to sell or dispose of any plant infested with or affected by any disease.

The article in our March issue on the advantages of deep cultivation has aroused considerable interest, and, as was to be expected, diverse opinions are expressed by practical farmers. It is hoped that many experiments will be tried in this direction by our farmers, but it must be remembered that one of the greatest advantages claimed for this practice is that moisture is conserved in the subsoil. To gain full benefit from the work, the land should be deeply cultivated when fallowed, so that the winter rains may sink into the subsoil, and be available for the succeeding wheat crop. To plough deeply just before sowing will not meet the case, and will, moreover, render it difficult to get the firm seed bed the wheat requires.

Considerable difference of opinion exists amongst farmers as to the wisdom of cutting wheat in the dough stage and threshing the grain out. A great many objections, founded more or less on fact, are made to this practice; but one correspondent to the daily press comes forward with the astounding statement that the cause of the bad color and condition of bread, of which the complaints were very general a few weeks back, can be confidently attributed to the use of flour made from headed wheat, and not, as attributed by the millers, to the newness of the flour. The fact that only a very small proportion of the wheat grown in South Australia is harvested in this way is in itself a complete refutation of this statement.

Last season a number of our farmers tried the method of manuring wheat adopted by Mr. Salter, of Victoria, but scarcely with much success. The mode of procedure is to pickle the wheat with bluestone in the ordinary way, and, while wet, thoroughly mix from 50lbs. to 80lbs. per bag of phosphatic manure with it and sow at once by hand. It is necessary that the manure and seed should be thoroughly mixed when wet so as to coat the seed with the manure. Some of our farmers allowed the seed to get dry before sowing, and state they got no benefit from the practice. This was probably due to the manure being brushed off in handling. As good results have been obtained from this method of manuring in Victoria, farmers who cannot afford to make use of the seed-drill would do well to try a few acres sown with wheat treated in this way.

Some few months ago a good deal of interest was taken in speying of cows, and it was hoped that considerable advantages would accrue to farmers who adopted the practice in respect to cows of uncertain origin from which it was not considered desirable to breed. Experience, however, in several of the Australasian colonies seems to point to the conclusion that our climate is too dry and uncertain to encourage the practice. When feed falls short, or becomes dry and innutritious, the cows fall off in their milk, and even dry off altogether, and they do not recover the milk-producing habit when feed again becomes abundant. It is also asserted that speyed cows do not give as much milk as those that are left in a natural condition.

The term "good feed" will bear various interpretations, according to the locality where it is used. In the hilly and South-Eastern districts it would mean rich succulent herbage of varied character standing knee deep on the field. In the mid-North a barrowful of last year's stubble on an acre might be considered fair pickings, and double that quantity of desiccated spear grass by some people might be thought to be "good feed." Anyway, there has really been no really good feed in that quarter for a long time past, and humane farmers recognising this have been giving their cows the hay which had been reserved for the working horses. But even hay is not nourishing enough for cows giving milk, and it must be supplemented with silage or cultivated green fodder. Because the indigenous herbage appears to be deficient in mineral matters, the Chief Inspector of Stock recommends dairy farmers in the North to give their cows (twice a week) half a pannican of the following mixture, in damp bran and chaff ration:—Forty pounds bone meal 20lbs. common salt (not rock salt), 2lbs. flour of sulphur, and 2lbs. sulphate of iron; also, in sheltered trough, leave some of a similar mixture for the animals to take if they feel the need. It would be desirable to sprinkle chaffed hay with a mixture of 1lb. molasses and 2galls. of water for each day's supply.

For dairy cows a simple ration of chaffed hay is not sufficient to maintain their bodily condition. They must have the material from which to make milk as well as flesh. A correspondent of the *Border Watch* found that his cows became poorer and poorer when fed only upon hay and bran; the milk became less and less in quantity. Each cow consumed about 140lbs. chaff per week. Then in place of one-half the chaffed hay he substituted 60lbs. Algerian oats, which was no dearer than the hay for which it was substituted. The cows at once began to yield more milk, and also to pick up flesh. Here is food for thought.

There are few plants more subject to deterioration than the varieties of sorghum and maize. At this time of the year growers of sorghum, &c., should select the finest typical heads of each variety to save for seed for next year. By this means they may in time secure very productive sorts. If a selection is not made, the following crop will be quite inferior to that of the previous season, and in time the seed will be of no value for sowing.

Mr. W. V. Wyllie forwarded to the Agricultural Bureau sample of grass (*Eragrostis pilosa*), which he states has grown this past summer on hard, alkali soil at Renmark, where nothing else seems to grow, and makes good feed both

green and as hay. The seed is supposed to have been brought down by the river water used for irrigation. This grass is an annual, growing from September to March or April, and on good soil reaches a height of 3ft. Like many more of our indigenous grasses, it would probably pay to cultivate. Our hot dry summers are too severe on most exotic grasses, and if our cultivators would only pay more attention to the conservation and cultivation of our indigenous grasses, which naturally withstand the heat much better, it would be to their advantage.

Quite recently some of the newspapers of the eastern Australasian colonies have published extracts from various sources to the effect that the Government of South Australia has expressed great satisfaction with the so-called fodder plants *Sacaline* and *Wagner pea* (*Polygonum sacalinense* and *Lathyrus sylvestris*). These statements are utterly untrue, and the Agricultural Bureau of South Australia has constantly warned agriculturists not to be misled by those who have seeds of these useless plants for sale. The prominent seedsmen of France and those of America, as well as the State Department of Agriculture of America, have unreservedly denounced the attempts to foist seeds of those worthless plants on the farmers, and the reports from New South Wales and Victoria are equally firm in denunciation.

There are several weeds which by Act of Parliament are declared to be noxious, and must be destroyed wherever found. The *Asphodel* or "Wild Onion" is one of these, and is now very plentiful in many places. It covers the land to the exclusion of all other plants, is somewhat poisonous, and is not eaten by live stock. It should be destroyed now, before it flowers, and certainly before seeds are produced. Each plant produces enormous numbers of seeds, and the fistulous roots are perennial. It will probably become one of the worst of pests that afflict our patient cultivators of the soil; but if such should be the case, those cultivators will have only themselves to blame, since the Parliament has placed it in their power to exterminate it if they choose.

## THE BEEHIVE.

### NOTES FOR MAY.

BY *APIS LIGUSTICUS*.

On the slopes of the hills, near Adelaide, there was a fine flow of honey from the gum trees during the first two weeks of April, which enabled the bees to quickly fill their hives. At Burnside some of the colonies gathered 50lbs. of honey in ten days. This is undoubtedly one of the best yields experienced for three years. The effect of this on most of the hives has been quite magical, and even comparatively weak colonies have been able to gather sufficient stores to carry them safely through the winter. Where the bees were extra vigorous drone brood has been raised, and the unusual sight will be seen of drones flying in May.

In this mild climate bees do not require very much preparation for winter, but it is well to take a few precautions if strong colonies are required early in spring. All surplus frames should be removed from the hive, and the bees crowded on to just as many frames as they can conveniently cover. Of course the number of frames will depend on the size of the colony; about six standard Langstroth frames are sufficient for an average colony; and eight for a very

large one. The frames should be arranged on one side of the hive, and a division board placed against the outside frame to economise the heat. Cover the frames with a piece of unbleached calico, and lay over that one or two thicknesses of old carpet or any other porous material that is at hand. The cap or cover of the hive should then be put on, and the whole protected with a good watertight roof. If the tops of the hives are flat, which they ought to be, the best roof in winter is a piece of corrugated galvanized iron held in place by a heavy stone. The iron should be large enough to project 3in. beyond the sides of the hive. Each colony will require at least 12lbs. of sealed honey to winter upon, that is about two well-filled Langstroth frames, but it will be all the better if they have three or four frames. It is a noticeable fact that bees which go into winter without sealed honey are sure to come out poor and weak in spring. With strong colonies a large entrance to the hive is most important during winter; the entrance should be about 6in. wide and about 3in. high. Several successful beekeepers have the entrance the full width of the hive, and claim that by so doing they prevent mildew from forming inside the hive. When removing the surplus combs from the hives, as previously mentioned, the honey should be carefully taken with the extractor, and the empty combs arranged in a box, so that the bees can have access to them and remove any adhering honey. When the combs have been so treated they should be fumigated with burning sulphur to protect them from the bee-moth; and then stored away for use next season. Experienced beekeepers know well the value of frames containing straight empty combs in the early spring, and therefore take some trouble to preserve them. All empty hives, frames, &c., that have been used during the past season should be scraped and well scrubbed with carbolic soap and water before putting them away for future use.

## POULTRY NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY D. F. LAURIE.

No doubt many readers of these articles intend, sooner or later, to purchase good specimens of poultry from which they may breed stock suitable for export, or found a strain of first-class egg-layers. In fact many people have written to me on the subject (as a rule neglecting the necessary stamp for a reply), so that I think it as well to give a description of the different breeds suited to our purpose which, although not full enough from a fancier's point of view, will yet serve those who are not *au fait* at judging the value of what they are buying. Some hasty people may form the conclusion that what are called mere fancy points are of no practical value. Now, actually the reverse is the case. A given breed is famed for certain economic properties; this breed is distinguished by certain points, in its purity, and it can easily be seen that any specimen which differs from the standard presents a case in which we may conclude there is foreign blood, or the bird has "thrown back," that is, has reverted to a former type. No standard would have been compiled except for a breed which would continue to follow that standard, and as such and such a breed excels in certain points it is safe to conclude that the more an individual specimen diverges from the standard the greater the probability that such divergence will be followed by a lessening or diminution of one or more of its valued qualities. I am not now discussing mere feather markings; that is a question by itself, and I shall say no more than this: that a bird having feathers of a color foreign to the variety is one not to be countenanced. As a proof that high-class stock is more valuable than ordinary I may point out that a

year or so ago the winning Indian Game—Dorkings at one of the leading English shows were bred from a Dorking cock and an Indian Game hen which had taken the highest honors as representatives of their breeds at the Crystal Palace Show. I am often written to to give the name of someone I can recommend, so that a bird, "not a first-class one," can be procured. Now, it is just as well to state that most breeders, at any rate those of experience and integrity, put all birds answering to such a description into the pot; they would not risk their good name by selling "culls." Make haste slowly. If you wish to improve your stock do so, but make a rule that when you decide on an alteration you will have exactly what is required. Stud poultry will always command a fair price; it is not everyone who can breed and rear them to perfection. It is of no use going to an obscure breeder and, at an apparent saving of a few shillings, procuring what he calls a bird of a certain breed; the chances are a thousand to one that the good old mongrels are better. When I was out lecturing I was shown a number of so-called pure-bred poultry at different towns. My conclusion was that the psalmist was referring to future poultry vendors when he remarked "I said in my haste all men are liars."

Now I will deal first with those breeds requisite to produce table poultry of a high class, and such as must be bred, even for the Adelaide market, if a decent price is looked for. For the export trade of course it is a *sine quâ non* to keep such breeds. I propose first to describe that backbone of all table poultry—

### The English Dorking.

Of late the Dorking has made great progress in this colony, and I am pleased to think that it was owing to my representations and advocacy that Messrs. Thyer, Osborne, Hair & Sons, and the State Children's Department imported the high-class specimens they now own. Dorkings up till that time had been steadily going to the bad; breeders had been trying to get size and shape by questionable means. Mr. A. J. Murray imported many good ones, and also purchased a good pair brought from Melbourne; still they did not circulate to any extent. I caused unkindly comment on one or two occasions by refusing, when judging, to take any notice of some so-called Dorkings, for I hold it is distinctly the duty of a judge to award notice only to representative birds. The Dorking is not, as is frequently stated, a delicate, poor layer; on the contrary, breed from good stock, feed in a rational manner, and treat the young stock well, and you will find the youngsters hardy, quick to mature, and the pullets are very fair layers—some very good. Dorkings are deep, square-bodied, massive birds, long keeled, short-legged, and carrying a large amount of the most exquisitely delicate white flesh covered by a delicate white skin; in fact, as a table bird there is nothing more to be desired. As mothers the hens are perfect, and even the old cocks show their gentle blood by, on all occasions, taking the lonely fledgeling under the paternal wing at night. As a show, ornamental, or fancier's fowl no man can cavil at the lordly high-bred cock or the queenly hen. Except in the very hottest parts, South Australia is well suited for the Dorking; they are very domestic and fly very little, and for that reason are suited well and thrive remarkably in orchards. Cold, wet climates cannot be detrimental to the breed when we consider that Irish and Scotch breeders have been very much to the fore of late in leading British shows. I may as well point out once and for all that Dorkings will not stand inbreeding; even when this is resorted to scientifically many unsatisfactory results accrue. I will now give a general description as published by Lewis Wright, adding anything further I may consider necessary.

*General Characteristics of the Cock.*—Head and Neck: General appearance of head rather large, but dignified, and free from coarseness; beak, stout and

well proportioned; comb, large, upright, evenly serrated, and free from excrescent growths; if rose, square or upright on the head, wide in front, and narrowing to a peak, pointing backwards with a slight upward inclination behind, and the tops of the points presenting an even surface free from hollow in the middle; rose-combed colored Dorkings are not now bred. These remarks will apply only to the White Dorking, which is always rose-combed. Wattles, very large and pendant; deaf ears, moderately developed, hanging as nearly as possible about one-third the depth of the wattles; neck, rather short, and very full of hackles, making it appear extremely broad at the base, and tapering rapidly to the head. Body: General appearance, deep and square, the outline, when viewed sideways, presenting almost the appearance of a short rectangle; back, broad and rather long; saddle, broad, but inclining downward to the tail, which springs out nearly a right angle; breast, very deep, prominent, and full; wings, large and broad. Legs and Feet: Thighs, large and well developed, but carried along the body so as not to be conspicuous; shanks, short, moderately stout, fine in texture, perfectly free from any sign of leg-feather, and set on well to the body, the spur in the proper position, pointing rather inside; toes, large and well spread, the hinder toe as nearly as possible in the natural position, and the extra (or fifth) toe placed above, starting from close—but not too close—to the other, but perfectly distinct, and pointing rather upwards—a bad toe points downwards, or the fourth and fifth are joined. Tail: Full and ample, carried nearly erect, but not squirrel fashion (that is pointing towards the head), and the sickles very broad and sweeping. Size: Very large, ranging from 10lbs. to 13lbs., and occasionally over 14lbs. in adults, and 8lbs. to 11lbs. in cockerels. General Shape: Square and plump. Carriage: Rather quiet, but stately, with the breast carried well forward.

*General Characteristics of the Hen.*—Head and Neck: General appearance of head, neat and matronly; comb, resembling the cock's if rose, but if single falling over one side of the face; wattles and deaf ears, as in the cock, but proportionately smaller; neck, short and neat. Body: Very similar in general appearance to the cock's, but longer in proportion. Legs and Feet: Like the cock's in all points with the exception of spurs. Tail: Well developed, and the feathers very broad, but carried rather closely if the bird is in healthy condition. Size: Very large, ranging from 8lbs. to 10lbs., and even more. General Shape: Plump and deep, but rather long compared with the Asiatics. Carriage: Staid and matronly.

*Color.—Colored or Dark Dorkings.*—In both sexes: Comb, deaf ears, and wattles, brilliant red. (There is a difference of opinion *re* deaf ears in silver greys, but red is the color, although a little white mixed does not matter.) Legs, a delicate white, with a pinky shade. I prefer a solid white, also the feet. Color of Cock: Hackle, white, more or less striped with black; saddle, resembling hackle; back, various shades of white, black and white, or grey, mixed with maroon or red; wing-bow, white, or white mixed with black or grey; wing coverts or bar, black glossed with green; secondaries, white on outer web, black on inner web; breast and under parts, black. Young birds with mottled breasts should not be rejected, as this moults out. The standard allows mottled breasts, but they are not desirable, except for pullet breeders. Tail: Black, richly glossed; an admixture of white, though allowable, is not to be encouraged. Color of Hen: Hackle, white striped with black; breast, a salmon red (this must not be a washy color), each feather tipped with dark-grey verging on black (rarely seen); rest of body, nearly black, the shaft of feather showing cream-white, and each feather being slightly paler on the edges (of no particular importance as it often gives a brown rusty look), except on wings, where the centre of the feather is a brownish-grey ground (I prefer the body color here), covered with a small rich marking surrounded by a thick

lacing of black; tail, also nearly black, the outer feathers slightly pencilled. The present ruling is for dark birds; the brown, rusty birds have, very properly, gone out of favor.

*Silver-Grey Dorkings—Color.*—In both sexes: Comb, face, deaf ears (see note above), and wattles, brilliant red; legs, white or pinky white—white preferred. Color of Cock: Hackle and saddle, pure silvery white, free from both straw color or marking of any kind; back, shoulder coverts, and wing bow, silvery white; wing coverts or "bar," lustrous black glossed with green or blue; secondaries, white on outer web, black on inner web with a black spot at end of each feather, corner of wing appearing clear white with a black upper edge when wing is closed; primaries, black, with a white edge on outer web; breast and all under parts, a deep black; tail, deep black. the sickles brilliantly glossed. Color of Hen: Hackle, silvery white, striped with black; breast, salmon red, shading off to silver grey on thighs; body and wings, a bright, clear, silver-grey (not a dark-lead color), finely but distinctly pencilled all over each feather with grey several shades darker, and free from any brown or red tinge. Numerous dark hens are evidently of colored origin; tail, dark grey, inside feathers black. A good hen has to be seen to be appreciated.

*STANDARD.—Colored Dorkings*—A perfect bird counts 100 points. The following represents the maximum points which can be deducted for each defect:—Coarse head, 6; faulty comb, 5; fifth toe not perfect in form and development, 10; tenderness on the feet, 8; color not good, 12; crooked breast, the standard says, 10. (All experts agree to total disqualification; therefore pass such birds.) Want of size, 28; want of general symmetry, 10; want of condition, 14; total lack of condition or gross over-fattening, 30. Disqualifications: Wry tails, crooked breast or back, or other deformity; absence of fifth toe; legs, any color but white, or with any vestige of feather.

*Silver-Grey Dorkings.*—Perfect bird counts 100 points. Defects to be deducted:—Coarse head, 8; faulty comb, 8; fifth toe imperfectly developed, 10; tenderness on feet, 8; faulty color, 24; crooked breast, standard says 10—again I say disqualify, and pass the bird; white in deaf ear, 4; want of size, 18; want of symmetry, 12; want of condition, 15. Disqualification: White in cock's breast or tail, crooked breast, or other deformity. Faking in any breed is a disqualification, and should be put down.

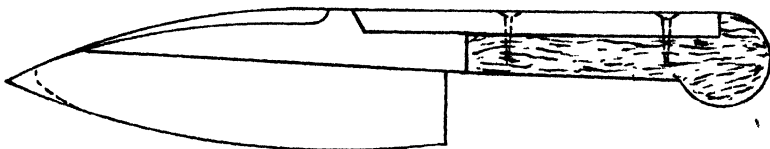
Those readers who officiate at country shows should learn this standard. There is more profit in breeding Dorkings than is the case with many new-fangled breeds. Space does not admit of descanting on the value of the Dorking for crossing—with the Indian game or old English game the acme table fowl is produced.

CHICAGO has just built for itself a new piggery, which is the largest in the world. In the language of the west, it is a "600,000 dollar hog-house," and is a new addition to the stockyards of the city. It has taken two years to build and is capable of holding 220,000 pigs, for which all the most recent improvements and a perfect water supply have been provided. It contains no fewer than thirty-six blocks of 100 pens each, on two floors one above the other; it is in two parallel sections, each 3,000ft. long, and connected with each other by twenty-two floor passage-ways. It covers 49 acres, and in its construction 18,000,000ft. of pine, besides oak girders throughout, have been used, while between 400 and 500 workmen have been constantly employed in its erection. Seven railway companies have sidings from which pigs will be delivered into this gigantic piggery, and for the offices of these two two-story buildings have been erected, one at each side of the "hog-house." It has been built in consequence of the inadequacy of the old hog-house, and will give accommodation for 75,000 head more pigs.

## UTILISED WASTE MATTER.

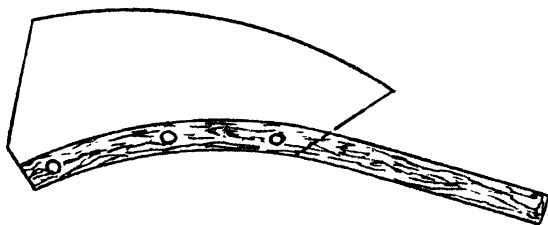
Mr. J. B. Sanders, Red Creek, near Woodchester, kindly forwarded some hints showing how the old sheepshears and worn-out knives of the chaffcutter may be impressed for further service. These articles are made usually of the best steel, and retain a good edge for a long time.

An excellent pig-sticker can be made from one of the blades of an old sheepshears by simply affixing a handle, thus:—



The rounded portion of the handle can be fitted on to portion of an old piece of axe handle, two holes drilled or punched through, and rivets put in. The blade can be shaped and sharpened on a grindstone. By rounding off the point in the way indicated by the dotted line the other half of the shears can be converted into a good skinning-knife.

A useful chopper for meat, or for many other purposes, can be developed from the blade of a chaffcutter.



The handle in this case should be sawn so as to let the blade in, and it can then be either fixed with bolts and nuts, riveting the ends of the bolts when screwed up very tightly, or rivets can be used. Grind the edge with short face on each side of the blade.

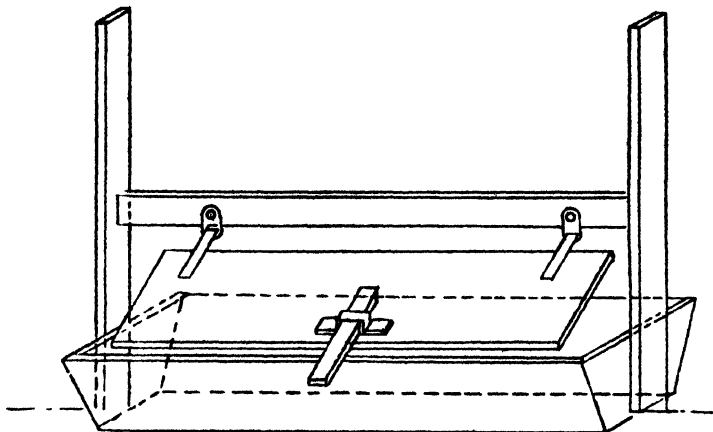
Good funnels for many purposes can be made from old gunpowder flasks by cutting off the bottom half.

Bottles can also be converted into funnels by wrapping a piece of tow or other similar material, saturated with turpentine, kerosine, or other inflammable oil, around at the place where it is desired to separate the top from the bottom. Fill up with water to that point, set fire to the oil, and the bottle will crack clean around. Another good and quick plan is to have a ring of iron about the diameter of the bottles; make it red hot, place it round the bottle for five seconds, then quickly dip the bottle in a bucket of cold water, which will at once separate the top half from the bottom. The lower part of each bottle will make an excellent jelly glass, or will do for jams, &c. A fine file may be used for rounding off the sharp edges of the glass.



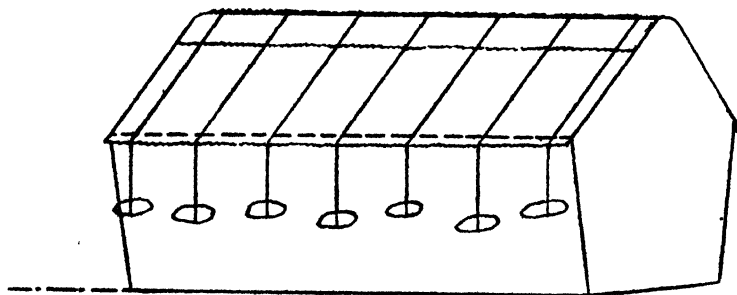
## FARM CONVENIENCES.

When feeding pigs, or when desirous to cleanse the troughs, much trouble and annoyance is generally caused by the stupid animals' interference. This can be prevented by the adoption of a swinging door, as here shown :—



The door should be hung to a rail over the centre of the trough, and have either one or two sliding bolts affixed to the lower edge. When it is desired to clean out the trough, or to fill it with food, push the swinging door inwards and fix it against the intrusion of the pig by means of the bolts. To give the animal access to its trough, reverse the door. To prevent the escape of the pig over the trough is easy enough by driving stakes or setting up posts which will prevent the door rising more than a foot above the outside edge of the feeding-trough.

Instead of thatching haystacks, &c., they can be protected with sheets of galvanized iron, linked together at the top end, as shown here :—



The ridge should be covered with iron bent in a half circle, and the whole of the sheets can be secured by throwing over them long pieces of old fencing wire, to each end of which heavy weights are to be attached. Such roofing will last several generations of farmers if carefully used.

## LIVE STOCK.

**THE MALLEIN TEST FOR GLANDERS.**—At a meeting of the Central Veterinary Medical Society, held at 10, Red Lion-square, W.C., on March 5, Mr. W. E. Taylor, M.R.C.V.S., veterinary surgeon to the London Road Car Company, read a paper on "Mallein and its Uses." He insisted that mallein was an infallible test for glanders when no clinical symptoms were present, and when the horse appeared to be in perfect health and condition. He had tried it on over 4,000 horses within the last few years in one of the largest studs in the metropolis. All the horses that reacted to an injection of mallein were slaughtered, and in every instance *post-mortem* examination discovered the presence of disease. The discussion which followed was opened by Professor M'Fadyean and continued by Professors Macqueen, Penberthy, William Hunting, F.R.C.S., and Veterinary-Major Nunn. All the speakers were in accord with Mr. Taylor as to the value of mallein for diagnostic purposes in detecting the early stages of glanders. Professor Macqueen said he believed that the non-recognition of mallein by the Board of Agriculture and local authorities generally had led to an increase of glanders and its wider distribution, as the mallein test was now privately used and scores of horses were sent to auction after reacting to mallein to spread the disease broadcast throughout the kingdom. It was carried unanimously "That this meeting is convinced that the experience possessed by British veterinarians has thoroughly established the reliability of mallein for diagnostic purposes in horses suspected of glanders. It is further of opinion that the use of mallein on all horses which have been in contact with glandered horses would greatly expedite and cheapen the work of suppressing the disease if conducted by local authorities."—*The Times*, 5/3/98.

## BREAD-MAKING.

Mr. T. Broad, Arrowic Station, *via* Blinman, writes that for five and a half years he has been making the best of bread, without a single failure, although sometimes the temperature rises to as high as 120° F. in the shade. He makes his yeast as follows:—Boil 2ozs. hops in 5qts. water for forty minutes; strain and let cool down to 90° F.; then stir in 1lb. sugar, 1lb. flour, and a little salt; add then 1pt. of previously-made yeast; let stand twenty-four hours; then stir it up and put in bottles. When weather is very hot he places the bottle containing yeast in water for two hours, by which time the body of yeast will have settled; then he fixes the corks in the bottles, but no string is required, as the yeast will not ferment until shaken up when required for use. It is important to have the yeast cooled down and settled before putting in the corks. If this is neglected the corks will blow out or the bottles will burst, and anyway the yeast will be wholly or partially spoiled.

For making bread he pursues the following course:—At 9 p.m. makes a bay in the quantity of flour to be used and pours in the yeast, adds water seasoned with salt. The water comes direct from the well, and in hot weather he proceeds to make the dough right away, taking care not to over-knead, but draw well together. This takes little time. Let stand not more than ten hours, by which time the dough should be very light. Then pull together, well dusting with flour; mould into loaves; let them stand to prove about thirty minutes, and then place in the oven till baked. The whole process does not occupy more than twelve hours. The bread will keep for a week, and never goes sour. He does not recommend to make a "sponge," or ferment, because there is a risk of over-working. On stations, by all means make the dough right away.

## MILK FORMATION AND COMPOSITION.

By G. S. THOMSON, N.D.D., GOVERNMENT DAIRY EXPERT.

### Formation of Milk.

The exact principle of the formation of milk in the udder of the cow is a matter of much controversy, and up to the present time no really definite proof of its formation has been established. Leading authorities and investigators have satisfactory reasons for believing that the breaking down of protoplasm in the cells of the glands, also the filtration of blood, producing the water and certain soluble products, go to form milk. These two theories are each supported by eminent authorities, and some investigators affirm that the blood is solely accountable for milk formation. For many years this theory was exclusively held until more conclusive investigations caused such to be regarded as only a partial means whereby milk is formed in the udder of the cow. It is quite evident, however, that filtered blood does not tend solely to the formation of milk, as illustrated by the diverse composition existing betwixt blood and milk. In blood sodium salts (principally common salt— $\text{Na Cl.}$ ) are the predominant chemical constituents; in milk potassium salts are more abundant, while the organic constituents, as casein, fat, and sugar, cannot be said to be in blood in any perceptible proportion. Moreover, if milk were the result of filtered blood, or directly influenced by the blood, why does feeding exert so little constitutional change over the solids? No doubt, when feeding is carried on to an extent insufficient to supply the demands of the living matter of the body, the condition of the cow retaliates: she loses flesh, becomes constitutionally less robust, and also, according to her temperament, more or less nervous. To prolong an animal's life under such circumstances flesh and blood must be utilised for her support, the milk-secreting glands will show signs of weakness, and the flow of milk will receive a check with a reduced quality.

This would seem to show that because the flesh and blood of the animal's body is being utilised to sustain life, and that blood has an influence in the formation of milk, accordingly quality decreases. That filtered blood is not in itself the result of the formation of milk may still more be doubted, since cows receiving food of an albuminoid ratio above the normal demands of the body do not produce milk with an albuminoid ratio in accordance with the high standard of food given, but may even fall below that of normal feeding. Formation of milk might to a more or less extent be controlled by the nervous temperament of the animal. If a nervous cow is roughly milked, or handled in a way unfamiliar to her accustomed treatment, the quality of her milk has, in many instances, been recorded to fall one-third of the fat percentage of the milkings taken immediately before.

A change to food possessing an obnoxious smell will induce a feeling of discontent in a sensitive and nervous cow, and thereby cause a change in the composition of her milk. The rapidity of such changes could not be directly due to blood influence, but in all likelihood to a checking of the activity of the milk glands, due to nerve affections. Change from a gentle milker to one inclined to be rather rough will bring about a reducing influence instantly upon the quality and quantity of milk from nervous animals. By strict attention to breeding from cows of marked individuality as milk producers, and possessing the points of a suitable and profitable dairy breed naturally fixed, will lead to success. Increased feeding must not be considered as lost, since a food high in albuminoids is also high in manurial value, and, when given in excess, is returned to the soil as a rich nitrogenous manure. I may mention that the other theory laid down as to the formation of milk—by the decomposition of the epithelial cells—can be supported when an examination of

colostrum is microscopically made exhibiting the presence of corpuscles with traces of cell structure. We may conclude that the rich quality and quantity of a cow's milk is due to the inherited fixed property which the animal possesses of making fat and other solids, and familiarly known to us as individuality. The formation of milk in the udder, we may infer, is partly influenced by blood filtration and partly by the breaking down of epithelial cells in the glands of the udder, and governed to a certain extent by food in the former and nerve energy in the latter.

### Composition.

The following is given as an average composition of milk :—

	Water .....	87.5
	Fat .....	3.5
Albuminoids—	{ Casein .....	3.5
Flesh formers	{ Albumen .....	.25
	Milk sugar .....	4.5
	Ash .....	.75
		<u>100.0</u>

Treating each constituent separately we will begin with water.

*Water* as a constituent of milk varies with different seasons of the year, period of lactation, breed, feeding, first and last milkings, times milked, &c. In newly-calved cows' milk, water may be estimated at 75 per cent. down to 70 per cent. Milk first drawn from a cow in normal milking will contain on an average 88.5 per cent. water, last drawn 82.5 per cent. water.

*Fat*.—The extent of fat will vary in accordance with the above-stated conditions as for water. It may be of interest to give the percentage of fat solids and water taken from analysis of first and last milking (strippings) at Wisconsin Experimental Station :—

	Fat.	Per Cent.	
		Solids.	Water.
First milk .....	1.30	11.83	88.17
Strippings .....	9.63	19.18	80.82
First quart .....	1.22	10.82	89.18
Last quart .....	8.48	17.24	82.76

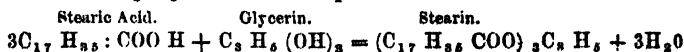
Ten varieties of fats enter into the composition of the fat of milk, and may be chemically tabulated as follows :—

### Chemical Composition.

Solid .....	{ Stearin....	$C_{57} H_{110} O_6$ ; melting point, 123° F.
	{ Palmatin ..	$C_{57} H_{98} O_6$ ; melting point, 144.6 F.
Liquid .....	{ Olein ....	$C_{57} H_{110} O_4$
Volatile—	{ Butyrin	
Predominate	{ Capronin	
	{ Caprylin	
	{ Caprin	
Volatile ....	{ Laurin	
	{ Myrestin	
	{ Butin	

Melting point of the fats as a whole ranges from 84° to 106° F. ; average, 95° F.

Chemically speaking, how are these fats formed? By a fatty acid and glycerin. Following equations will explain :—



The same takes place with palmatin and other fat formations.

It is these volatile fatty acids which are said to give butter its fine aroma.

In Australian butter, possessing as it does a distinctly high aroma, those volatile fatty acids must be above average percentage. Washing of butter-grains can be carried on when necessary with more frequency, enabling the product to be more free from buttermilk without distinctly injuring the aroma.

The size and number of fat globules vary considerably in the different breeds of cattle, and many other conditions influence an alteration. The size of fat globules may be taken as from 0.0005 to 0.01. The milk from Jersey, Guernsey, and Shorthorn cows contains large globules of fat, and accordingly are best suited for butter-making. In the first place a more perfect separation takes place, and a lower percentage of fat is lost in the buttermilk. Milk from the Ayrshire and other breeds of cattle having fat of small globules is more adaptable for cheese-making, the small globules being more readily held by the coagulation of the casein. Fat globules magnified 200 to 300 times in normal milk appear in clusters of hundreds of a spherical shape, and having a light-yellowish appearance and highly refractive.

If pasteurised milk is examined under the microscope this grouping of the fat globules will be found wanting, an even distribution being now visible. This in itself would point out the great value of a system of pasteurisation, independent of its other valuable aids. Less loss of fat will take place in butter-making where the cream has been pasteurised, where this disastrous grouping of variously-conditioned fat globules no longer exist. Where no refrigeration, no pasteurisation is found in the butter factories of the Australian colonies, by means of a little calculation alarming losses could be proved. Grouping of fat globules in milk is destroyed at a temperature above 149° F.

*Cooling of Fat Globules.*—As fat retains its heat for a longer period than the other solids of milk, it must be borne in mind that a thorough cooling down of cream is necessary prior to ripening. Where this is not attended to, although the temperature of the cream may stand at 58° F., the fat as a constituent of the cream may be considerably over 60° F., resulting in a twofold loss in the butter-making.

*Casein.*—Composition of casein is taken as follows:—

Carbon .....	53.00
Hydrogen .....	7.12
Oxygen .....	22.60
Nitrogen .....	15.65
Sulphur .....	.78
Phosphorus .....	.85
	<hr/>
	100.00

The composition of this substance is seen to be more complex, having, in addition to carbon, hydrogen, and oxygen, two other elements—sulphur and phosphorus. Milk casein cannot be said to possess a pure form. Compared with pure casein as a soluble compound in water, it differs in being only slightly soluble. The appearance of casein in the dry state much resembles that of egg albumen. It exists in milk in a semi-colloidal condition, and is principally accountable for the viscosity of milk. By means of centrifugal separation casein can be removed from milk, and in the separator can be observed adhering to the bowl; also by filtration through porcelain milk may be freed from this albuminoid. Casein is not coagulated by heat, only by rennet and dilute acids. It is probable that lime salts are associated with casein, which may account for its partial solubility. It is definitely known that coagulation of milk will not take place when the lime salts have been removed or converted into an insoluble form. This can be proved by sterilising milk by heat, the lime salts becoming changed into an insoluble form, and when rennet is added to the sterilised milk

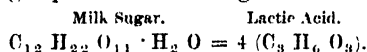
no coagulation takes place. Hammarsten proved that such a change takes place by a very nice chemical experiment, which, however, need not here be explained. In the past dry summer in this colony cows have been observed to show a strong desire for eating bones, which may be attributed to the deficiency of lime salts as well as intense hunger. In the making of butter we desire to get rid of casein by washing the butter in the churn when in the granular form, also by working in the buttermilk. Should this be neglected the keeping quality and flavor of the butter suffers; ultimately decomposition of the casein takes place, due to bacterial growth.

*Sugar.*—Chemical formula— $C_{12} H_{22} O_{11} \cdot H_2 O$ .

*Composition.*

Carbon .....	40.00
Hydrogen .....	6.10
Oxygen .....	48.90
Water .....	5.00
	<u>100.00</u>

In milk this substance is in a perfectly soluble condition, and is immediately liable to attack by bacteria. A form of bacteria, called *Bacillus acidilactici*, principally changes milk sugar into lactic acid; hence the souring and curdling of milk. The following represents the change:—



Milk sugar is distinguished from common cane sugar in being (1) less soluble in water, (2) of a less sweetish taste, (3) does not readily undergo alcoholic fermentation, (4) has a lower specific gravity, (5) readily converted into acid by bacteria.

When milk is pasteurised, or heated above 158° F., the milk sugar becomes decomposed, giving off a very familiar smell of burnt sugar, and if the temperature be increased sufficiently high the color of the milk may assume a brown tint. Ripening of cream for butter-making is just a process of sugar fermentation brought about by the acid-forming bacteria. When sour milk has been separated for cream the properties of ripening become partially destroyed; the cream may have arrived at the second stage, whereby the casein or other injurious ferments will have begun their injurious work before the butter is made. Separating sour milk means separating milk with little food, little sugar for the necessary ripening bacteria, and thereby providing an opening for objectionable species. In washing butter it is also necessary to get rid of whatever sugar may be left, as well as caseous matter. With under-ripened cream the buttermilk will certainly contain an over-proportion of sugar. Should the butter grains not be entirely freed from the sugar by washing, the butter will accordingly suffer by the formation of acid, and in all probability will be followed by rancidity.

*Albumen.*—

*Composition.*

Carbon .....	52.19
Hydrogen .....	7.18
Oxygen .....	23.13
Nitrogen .....	15.77
Sulphur .....	1.73

Like sugar, it is in a state of solution, but differs in composition by containing nitrogen and sulphur. Casein and albumen are termed the albuminoid constituents of milk. Albumen, compared with casein, contains no phosphorus, but can be coagulated by heat, 158° to 167° F. bringing about this change. In highly pasteurised and sterilised milk these albuminoid substances may become partially decomposed, causing the peculiar taste displayed by milk so treated.

According to scientific investigators, three other nitrogenous substances occur in milk, as lactoglobulin, lactoprotein, and fibrin. Lactoglobulin, like albumen, is in a state of solution. When milk freed from casein, and afterwards treated with magnesium sulphate ( $Mg\ S\ O_4$ ), lactoglobulin is precipitated. When casein is removed by acid, residue boiled to precipitate the lactoglobulin and albumen, lactoprotein is obtained.

*Ash Constituents.*—The ash constituents in milk is but small, varying about  $\frac{3}{4}$  per cent. to 1 per cent.; still the mineral matter of milk has an important influence on its nature and properties. The following may be taken as the percentage composition of the ash (Schrodt):—

Potash .....	25.42
Soda .....	10.94
Lime .....	21.45
Magnesia .....	2.54
Ferric oxide .....	.11
Sulphuric anhydride .....	4.11
Phosphoric anhydride .....	24.11
Chlorine .....	14.60
	103.28
Deduct oxygen, replaced by chlorine ....	3.28
	<u>100.00</u>

Magnesium, lime, and phosphoric anhydride are said to be in a state of suspension. We may account for the presence of phosphoric anhydride by the oxidation of the phosphorus in the casein, sulphuric anhydride by oxidation of sulphur in the albumen; potash and magnesium may be in combination with citric or other organic acids. Other substances, as urea, lecithin, hyponaathin, kreatin, chlorestin, leaucin, and tyrorin, have been found.

(To be continued.)

## PIG-BREEDING AND BACON-CURING.

(Paper prepared by the late Mr. T. N. Grierson, Manager Bodalla, New South Wales, and reprinted by request.)

### Breeds of Pigs.

During many years I have had experience with some of the best pure-bred pigs to be found in the Australian colonies, viz., Berkshires, Essex, Poland China, large and medium White Yorks; also grades from all the above breeds. After giving each of the above breeds a fair trial I have come to the conclusion that for general purposes the black breeds are much more suitable to the Australian colonies than the white breeds. They invariably withstand extremes of temperature better than other varieties, and for first position I would place the Berkshire *cross* first, the Essex second, and Poland China third; and my advice to farmers about to start pig-breeding for *general purposes* is to select a few good roomy lengthy sows of any grade, and put them to a good *pure-bred* Berkshire boar. Some breeders say it is a mistake to cross, and whatever you do keep them pure. My experience, however, is that for *general purposes* the cross is superior to the pure bred.

It is necessary, however, to have clear and definite ideas on this subject. We must know what we are talking about, and we must know what we want, and why we want it. If we want pigs to take prizes at agricultural shows, that is one thing (then by all means raise pure breeds); but if we want pigs that are healthy, hardy, vigorous, and that are to some extent capable of taking care of themselves, and which at the same time will grow rapidly, fatten easily, and

produce a large amount of ham, bacon, and lard in proportion to the food consumed, "that is another thing," then I say the grades will fulfil this better than the pure breds. As I have previously stated, they are hardier, healthier, more vigorous, better mothers, and have large litters.

I do not, however, wish it to be understood that no farmers should breed pure breds. Far from it. Without pure-bred pigs we cannot have grades; but the breeding of pure pedigree pigs requires more care, skill, judgment, and experience than many farmers can afford to bestow on them; therefore the breeding of pure-bred pigs can safely be left to those who have the means, accommodation, skill, and judgment for such work.

I remember that there used to be an old saying "that pigs were either gold or copper, but never silver." This sentence tolerably indicates one of the difficulties which pig breeders have had to meet with in these colonies during the last few years. It lies in the very great fluctuations which occur in the saleable character of swine. It very often occurs they are either in great demand and scarce, or else there is quite a glut. Let any circumstance arise causing much demand and high prices for corn and roots, and then pigs, in dealer's lingo, can "hardly be given away." On the other hand, when corn and vegetables are very cheap the demand for pigs immediately becomes brisk and prices high. Those who have been breeding pigs in the past have found such variations continually recurring, and this has no doubt to a large extent kept many farmers from going more largely into the business. I am, however, of opinion that such variations will seldom happen in the near future, when once the frozen meat trade gets fairly established; and with our facilities for transportation, and the ease with which pork can be cured and shipped to any part of the world, it will be found to be one of the most profitable products for export, especially for pigs of good quality, weighing from 120lbs. to 160lbs. By this means a steady demand will be created, and will do much to advance the agricultural interests of the colonies.

With our mild comparatively temperate climate pigs can be more profitably kept in many parts of these colonies than in any other part of the world; but to bring about this one thing is necessary, viz., to so arrange the keeping and feeding of pigs as to be able to realise a maximum of profitable results from a minimum of expenditure, and to have things so managed as to be able to feed and attend properly to their wants without the employment of much labor.

To produce pork at a profit, it must be a recognised fact that the pig is a grazing animal. This is one of the great secrets of success in profitable pig-keeping. If the keeping of pigs entails a large outlay of money for food and attendance they become an expensive luxury; therefore I would impress on those who wish to keep pigs profitably that they must buy as little as possible, must have as few whims as possible, and must be content to turn to good account everything that is on hand, or that may be nearest to hand.

Farmers who breed and rear pigs (and no farmer should be without some) should therefore provide paddocks, laid down with lucerne or clover, as a run, convenient to the homestead. The advantage of having them convenient is that if it is a dairy farm the whey or separated milk can be run in pipes from the dairy to the pig paddock, thus saving the expense of cartage. The area of the paddocks can be made according to the number of pigs intended to be kept, and several small paddocks will be found much better than one large one. By having several paddocks, the different classes of pigs can be kept separate; it is a very unsatisfactory way to keep all classes together. In the spring and summer months it is seldom the dry sows or stores require any extra feed, while it may be desirable to feed the weaners; and, by having separate paddocks, this can easily be accomplished.

Shelter, of course, must be provided alike from the excessive heat of the sun



and the cold wet weather in winter. This shelter-shed need not be an expensive building—round posts, with saplings for joists, and the roof composed of straw, topped well up, and thatched.

Water must also be provided. The importance of a constant supply of good water cannot be over-estimated; therefore, where convenient, water should be laid on to water-troughs, or the paddock should enclose a small portion of a running stream. In no case should a swamp or marsh be included in a pig paddock. Where pigs have access to such places there is always a large percentage of deaths from lung and other diseases.

Sties must be provided for housing the breeding sows while they have litters. Expensive buildings are unnecessary for economical pig-keeping; and, where timber is plentiful, good sties, with bark roofs, can be built at about 40s. each. In selecting the site for sties, a high and dry foundation is essential, so that the liquid from the pens will rapidly drain away; and a warm aspect is absolutely indispensable.

The sow, when about to have pigs, should be put in her sty at least a week in advance, so that she shall become quiet and accustomed to the pen.

The period of gestation in the sow is sixteen weeks, and the young pigs can be weaned in from six to eight weeks, according to the condition of the sow. A good mother generally gets very thin, and it is well not to allow the pigs to remain too long on her. A sow will generally take the hog the fifth day after weaning the pigs. Some breeders state that a sow will mate with the hog a few hours after farrowing; but during all my experience I have never known such to be the case. It is a good plan to keep sows from overlying her young by fixing a round sapling round her sty 9in. from the floor, and 6in. from the wall; this protects them from being crushed when the mother lies down. Some sows eat their young, and when such is the case the most profitable plan, as a rule, is to turn them into bacon as soon as possible.

The male pigs should be castrated when a month or five weeks old, so as to be thoroughly recovered before they are weaned.

### The Feeding of Pigs.

As I have previously stated, to produce pork at a profit, it must be a recognised fact that during the growth of a pig it must be treated as a grazing animal, and the outlay for feeding and attendance, if proper paddocks are provided, will be a small item.

The most important time a pig requires attention and feeding is when newly weaned for a few weeks, so as to keep them growing rapidly from that on until they are required to be topped up for bacon. If a good run is provided for them they will require little attention.

The system adopted in many parts of New South Wales, where maize is largely grown for fattening pigs, is to turn the pigs at large into the crop; and by adopting this method pigs can undoubtedly be fattened as cheaply as in any other part of the world. The pigs will harvest the grain cleaner and cheaper than by any other process. In South Australia, and other parts of Australia, where maize cannot be profitably grown, the same system could be adopted with regard to crops of peas, barley, or wheat.

The statement that so many pounds of maize, barley, wheat, or peas will produce so many pounds of pork is plausible in theory, and strictly correct in a sense, but it does not always work out in practice all the same. It will only do so under certain conditions. Dry grain of any sort, fed alone, will not produce the best results, and the steaming or boiling of grain entails too much labor and expense when prices are low, especially if a large number of pigs are intended to be fattened; therefore the most profitable system is to turn the pigs at large into the grain crop, and, during the time they are feeding on the dry

grain, to allow them some melons, pumpkins, mangolds, or other roots, and they will be found to increase in flesh rapidly, and the flesh will be of a more healthy and better description—the meat being of a firm, streaky nature, so much appreciated by all lovers of a slice of bacon. The public of the Australian colonies, as a rule, do not care for too much fat; the object, therefore, should be to produce meat that will be appreciated by the majority of the people. If the above system is carried out in the fattening of pigs, and they are not allowed any pumpkins, melons, or roots, or other green food for *one week* previous to killing, not only will it be found a profitable undertaking, but the produce will be of the highest quality.

### Bacon-Curing under the Factory System.

Like the dairying industry in latter years, the manufacture of bacon and hams has undergone great changes. The old expensive system of dry-salting has been almost entirely superseded by the less expensive method of curing with pickle in tanks. This method is not only less expensive, but it is the safest and most profitable for the climate of the Australian colonies.

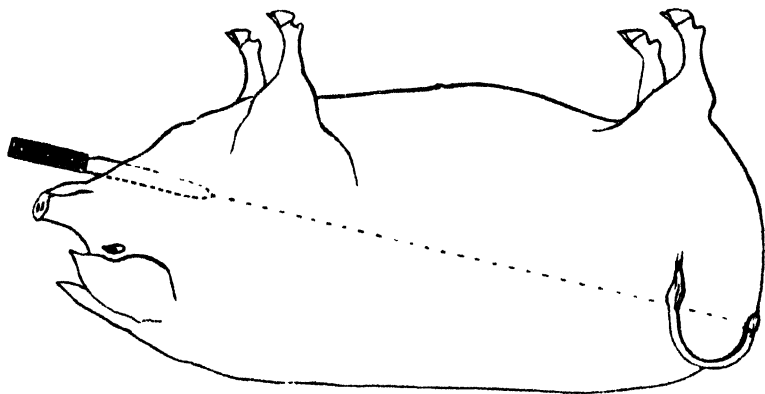
There is at the present time a new process coming into vogue, which is attracting considerable attention amongst bacon-curers. The process is called the "mild cure." The discoverer of the new process of curing was, it appears, an eminent chemist—the late Mr. William Oake, of Ulster. In an experiment it is said he discovered that the antiseptic properties of salt were to be found apart from chloride of sodium (salt), and that the obnoxious effects of dissolving the albumen in the curing process could, therefore, be avoided. This is supposed to be the key to the new system of curing. By the new process of treatment it is said that the bacon and hams, although thoroughly cured with the very essence of salt, still retain all the albumen originally in the meat, and yet do not taste salty to the palate. By the new process the lean of the cured bacon remains soft and juicy, and natural in color; and the best proof of the value of the system is in the fact that where the mild cure has been adopted the bacon and hams will keep for any length of time in any climate. A great deal of labor, it is said, is saved by the new process, while the article put on the market is declared to be much superior in taste and flavor and quality to bacon cured on the old system.

Whatever may become of the new process, whether a success or not, it is certain that the time has now gone past for farmers to kill and cure for sale their own pigs to best advantage. The trade now requires an article well got up and of uniform quality to bring the highest prices, and as a rule farmers have not the convenience for such work, and therefore are unable to compete against factories where they have all the latest appliances. It is therefore advisable for farmers either to co-operate and build a factory, or to sell their pigs to some individual or company in the trade.

A factory with a capacity for working from 120 to 150 pigs per week, with refrigerating room and all machinery required, can be erected for about £1,000, and pigs of an average weight of 125lbs. can be killed, cured, smoked, and made ready for placing on the market at a cost of 4s. per head. In these times of keen competition and low prices, to make bacon-curing a profitable industry no bacon should be held longer than from six weeks to two months, and hams from three to four months—the longer it is held the more weight it loses, and very often does not improve in quality.

The following is the system adopted in curing bacon with pickle. It is necessary to have a number of tanks, either built of brick and cement, slate, or wood. If timber is the most easily got, 2½in. planks well put together will answer. These tanks, if made 5ft. square by 40in. deep, will hold fifty ordinary sized pigs. Tanks sufficient for one week's killing, with one spare tank for turning over the bacon, will be required.

Pigs that are to be killed should be kept without food for twelve or fourteen hours, and during that time should be yarded up adjoining the slaughter-house. In no case should pigs be driven or heated in any way just prior to killing. From the yards to the killing pen a small race can be made, where from six to eight at a time can be run in and killed; and the best method of killing is to stun the pig by a smart blow on the forehead, halfway between the eyes and the top of the head, with a hammer or similar weapon; then, before the pig can struggle, turn him square on his back, place a foot on each side of the head, facing the animal, holding the head down to the floor by placing the left hand on the snout. Now place the point of the knife on the animal's throat, at the same time looking over the carcass and pushing the knife in a straight line in the direction of the root of the tail. If you do not stick just right the first time, you will see why when the pig is opened. A little observation will enable you to become an expert pig sticker.



The killing pen should be raised from the ground about 2ft. 6in., and the floor allowed about 2in. fall. The blood will then flow all into one corner, where a receptacle can be placed underneath, and the blood all saved and used or sold for manure. From the floor of the killing pen the pigs can be drawn easily into the scalding vat, which should be placed adjoining the killing pen. A good size for the scalding vat is 6ft. long, 4ft. wide, and 2ft. 6in. high, and if a steam pipe is laid on from the boiler into the scalding vat the water can always be kept at a regular temperature—the best heat for scalding is 160°. Adjoining the scalding vat should be placed another vat of similar dimensions for cold water. After the pig is scraped it should be dropped into the vat of cold water, which will cleanse and cool the carcass and get the final scrape before being drawn up by the gamble on to the aerial tram, where the internals are removed and the backbone cut out, and then run into the factory, where they are allowed to hang till the following morning, when they are cut up into fitches or full sides, according to the size of the pigs.

As the carcasses are cut up the portions are laid on the floor of the factory (which should be made of concrete or flagged), flesh uppermost, and lightly powdered over with saltpetre, so as to drain off any blood. It can then be placed in the tanks for salting in the following manner:—Sprinkle the bottom of the tank with salt, then put in a layer of sides or fitches, sprinkle saltpetre over them lightly, and then salt and sugar. The next layer of sides or fitches is put in crosswise, and served in the same way, and so on until the tank is full. Then place a lid to fit inside the tank (inch battens 3in. apart will do); fix an upright on top of the lid to keep the bacon from rising when putting in the pickle. The pickle to be made as follows:—To every 10lbs. of salt add

8lbs. of dark-brown sugar, 1lb. of spice, and  $\frac{1}{2}$ lb. of sal-prunella. Make it strong enough to float an egg; let it settle for some time, then skim, and it is ready to go on to the meat.

At the end of forty-eight hours turn the meat over into another tank, taking care to put the sides that were on top in the bottom of next tank, treating it as regards saltpetre, salt, and sugar exactly the same as at first, and using the same pickle. It can then remain until the seventh day from when first put in. It can then be taken out, and stacked on the floor of the factory, putting some salt between each layer, but do not stack higher than four sides deep, until it has been on the floor for some days, when it should be turned over, and stacked higher each time until the fourth week from the day it went into the tanks; the bacon will then be cured.

The bacon can then be placed in tanks containing cold water, and allowed to soak all night. Wash well with a brush, then hang up to dry, and when properly dry it can be trimmed and smoked.

As hams require slightly different treatment from the bacon, separate tanks are required. Before placing the hams in the tank rub over the face of each one a thin layer of brown sugar. When the first layer is placed in the tank sprinkle over with saltpetre and salt, same as with the bacon, treating the balance the same as at first until the tank is full. Make the pickle same as for bacon, and leave the hams same time in tanks. Always retain the same pickle for the hams, and in no case use the bacon pickle for hams. The same pickle can be used for many years—the older the better; it only requires, when it becomes somewhat muddy, to be boiled and clarified. I have seen pickle which had been used in one factory for sixteen years, and that factory produces some of the best bacon and hams in Australia.

### Smoking Bacon and Hams.

The smokehouse should be built according to the intended output of bacon and hams, and the walls of the building should not be less than 12ft. high. One of the principal things in smoking bacon is to have the smoke as cool as possible before coming into contact with the bacon, and to assist this it is well to put a floor 6ft. 6in. or 7ft. from the ground, just allowing a slight opening between the flooring boards to allow the smoke to make its way up to where the bacon is hung. The fitches or hams should be hung as close together as not to touch, so as to allow the smoke to penetrate every portion. A small slide can be put in the gable of the smokehouse to regulate the smoke as required. A place should be made in the centre of the floor, say 6ft. by 3ft., where the sawdust is placed. This is lighted, and if the door is kept closed there will be no flame, but the sawdust will smoulder and cause a great quantity of smoke. From twenty-four to forty-eight hours will suffice to properly smoke the bacon if the weather is suitable, after which it may be packed and forwarded to market.

Where teatree (*Melaleuca*) is obtainable it is excellent for smoking; it imparts a flavor to the bacon which is much appreciated by many people.

**MILD-CURE BACON.**—In all of the large cities of Britain and the European continent the public demand is for mild-cure bacon. The system of cure is very simple and perfect, but requires expenditure of at least £1,000 on the plant for carrying it out. By this process the albumen of the meat is retained and is not coagulated, so that the bacon is devoid of excessive salt, is by no means hard or dry, and there is no loss of weight in the curing. A factory costing £2,000 to construct could easily cure 400 pigs per day. The process takes about a month to complete, but after the first day there is no further labor involved.

## POTATOES.

An interesting report has been issued by the Texas Experiment Station on trials with potatoes. The different varieties were planted in 50ft. rows, there being 3ft. 6in. between the rows and 14in. between the setts, which were cut to two eyes, "seed ends" being rejected. The drills were 4in. deep, and the setts were covered by means of a broad sweep run once between the rows, which operation left a ridge above each row. These ridges were left until the plants began to show, when a light harrow was run over the ground to pull the ridges down somewhat and kill any weeds. Shallow cultivation after each rain was given up till blooming time.

Fifty varieties were tested, most of them being unknown to South Australia. Early Puritan, Early Ohio, and Bliss' Triumph yielded at the rates of 295½bush., 277½bush., and 270½bush. of large potatoes per acre respectively, while Early Rose, Beauty of Hebron, and White Elephant yielded at rate of 217½bush., 166bush., and 132½bush. respectively. Bliss' Triumph is described as a large round smooth tuber of light-red color, a good keeper, early, and the most popular variety in the South. Early Ohio is large, round to oblong, dull white in color, a good keeper, early, and an excellent variety for spring crop. Early Puritan is only medium early, with smooth, oblong white tubers.

Various fertiliser tests were conducted. The best yield was obtained from the use of 300lbs. bone black mixed with 200lbs. potassium sulphate per acre, the yield of Triumph variety with this mixture being equal to 363bush. per acre, the net profit from the use of the fertiliser being \$35 per acre, about £7, but 300lbs. of bone black gave an equal amount of profit; 150lbs. potassium murate gave a profit of \$33. In every case in which nitrate of soda was used the crop was actually less than where no fertiliser was applied. The writer of the report states that generally sandy loams are deficient in potash and heavy clay soils in phosphoric acid, and that if the grower has plenty of wood ashes or barnyard manure it will not pay him to invest largely in commercial fertilisers at present high prices. In arriving at the profit or loss the potatoes are valued at 50 cents a bushel (say 2s.). Bone black cost £4, murate of potash £10, sulphate of potash £11, and nitrate of soda £12 10s. per ton.

Experiments in storing the tubers were also undertaken. Treating with Bordeaux mixture, slacked lime, immersion for fifteen minutes and one hour in a 2 per cent. solution of sulphuric acid, and lime and sulphur sprinkled over the tubers did not give satisfactory results when tested on a small scale. Tubers in barrels of dry sand soon rotted; tubers put 2ft. under the soil and covered with 1ft. of earth, tiling to give ventilation being run through the centre, all rotted in six weeks; spread on the ground in partial shade and covered with 2in. layer of hay, which was kept moist by sprinkling occasionally with water, the tubers kept fairly well until October, fully 50 per cent. being quite sound. Some were not dug, but left in the ground, more earth being turned on the rows. Some tubers kept in good condition until February of the following year, fully 50 per cent. being sound in September.

To grow a second crop the tubers should be allowed to ripen thoroughly before they are dug. Then spread them out in the sunlight for a few days until they assume a slightly green color; afterwards spread them on the ground in the shade, cover with straw, and keep damp. In two or three weeks the early varieties will show signs of growth, when they are ready for planting. Best results were obtained from large tubers cut to two eyes and planted immediately after cutting.

## THE VINEYARD.

## NOTES AND HINTS FOR MAY.

*Written for the "Journal of Agriculture and Industry."*

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

The eccentricities of the season are beginning to tell on vines in our drier localities. In many instances drought and heat combined to make them shed their leaves at an extremely early period of the year—February and March; in fact, the leaves fell before the wood had time to ripen, and the straggly, denuded green shoots went far to disgust the enterprising pioneers in vine-growing in the drier districts. The early April rains, followed on by comparatively warm weather, in the day time at all events, have brought about a reaction, which can hardly be looked upon with favor. New leaves and shoots are rapidly developing, and many sore-tried vineyards are assuming the tender tints of the spring garb. Were it possible to imagine that these leaves could reach full development without being destroyed by early winter frosts, of which we have been having a taste lately, it is more than probable that by building up new reserve material and helping to ripen the wood their unseasonable appearance would be of some benefit to the plants. In the majority of cases, however, they will be shrivelled up by the first frosts, and the tender tissues of the unripened wood will suffer more than if this reawakening of vegetation had not taken place.

The above, however, is only by way of introduction. It is necessary that growers should be brought to understand that during the past season vines have in reality suffered severely, not only in their fruit, but in their growth and development, and that during some seasons to come the effect of their sufferings will be expressed by weakness and inability to carry to perfection the heavy crops they may see fit to set. It need not therefore be urged that anything that can be done to mitigate the evil should be attempted by the careful and intelligent grower. And here let me say that under our conditions it is during the winter season that the grower can best help along his weakened vines. There are two antidotes to drought and weakness, and these are good winter cultivation and manures.

Amongst the majority of South Australian growers it is the unfortunate and erroneous practice to defer the first cultivation of the soil until September. The reasons for this practice are obvious, if not convincing. Plough early and the weeds will grow vigorously, and you are then compelled to plough a second time; plough late and you are spared the expense of a second ploughing! It would be extremely unfortunate if we had no weeds, as I am afraid that if that were the case many growers would give up the tillage of the soil altogether.

Now, what are the advantages of early ploughing in a dry country? The answer appears to me obvious enough. From the spring forward the soil of a vineyard has been tramped down and become more or less consolidated, even constant shallow scarifyings contributing their share to this work. In consequence of this the winter rains that fall on untilled soils either run away or lie on the surface and disappear under the influence of evaporation. Were the soil opened out to a good depth the fertilising moisture would penetrate readily into the lower depths of the soil, where it becomes of immeasurable value during hot, dry summers.

But, more than that, winter cultivation has other important objects. It aerates the soil, allowing the oxygen of the air to act upon its various constituents, rendering them more readily available as plant-food; to promote the development of the soil bacteria, which carry on a similarly useful work. From this

point of view the larger the surface of soil exposed to the action of the air the better, and I would therefore always recommend that the winter ploughing be given on a good deep furrow, not less than 6in.

To sum up, the sooner the winter ploughing is started the better, and let it be complete and thorough. Between trellised vines a few furrows can always be opened out before the vines are pruned. This practice is therefore recommended as worthy of adoption.

And then vines might be manured, and **MUST** be manured if they have made poor growth. Manuring should in reality be adopted as an annual practice, as is the case in the more advanced south of France districts; but there are cases where it imposes itself upon the careful grower as an imperative necessity, and this is the case when plants have suffered considerably. The question of the kinds of manures to be used will vary considerably with soils and districts. It may, however, be stated in general that nitrogenous manures, such as nitrate of soda, sulphate of ammonia, &c., stimulate growth, and are therefore specially adapted to weak plants; that potassic manures induce generally heavy fructification, whilst phosphatic manures are required in far lesser quantities than by other plants. Sulphate of ammonia or nitrate of soda, according to circumstances, should be used at the rate of 2cwts. to 4cwts. per acre; sulphate of potash, 2cwts. to 4cwts.; kainit, 4cwts. to 6cwts.; and superphosphate about 1cwt. The different manures, unless one has a special object in view, can be used separately or conjointly, and in the latter case the relative proportions would, of course, be reduced.

Apply manures early in winter before first ploughing, spreading uniformly over the soil.

## AUSTRALIAN AND FRENCH WINES.

A COMPARISON, BY E. BURNES YOUNG.

The object of the following remarks is to examine the disparity which exists between the wines of Australia and those of European growth, either from the culture of the vine, the manufacture of the wine, or the methods of marketing, with a view to ascertain, not the excellence pertaining to Australian growths, but where they are susceptible of improvement.

In point of climate Australia has certainly the advantage over most, if not all, of the vine-growing countries of Europe. In Australia there are no variations during the maturing of the grape and the culminating vintage, such as occur, for instance, in France, where the climatic conditions are sometimes so unfavorable as to stamp the vintage of immense areas as very poor. On the other hand, centuries of experience have taught the French which are the best soils for certain classes of grapes. This remark may be allowed to stand, although it may not be wholly correct, because the question arises how far the original grapes have been modified by or adapted to the soil on which we see them to-day. The probable truth is that what we see to-day is the result of the two causes. There is, at any rate, a complete classification of the soils of France, and an experienced French vigneron would be able to say what class of vines would give the best results in certain districts; indeed, there are maps to show to within a few feet where one class of soil begins and the other ends. This valuable information Australia entirely lacks, and though in some cases the vines may have been planted upon the soils best suited to the grapes they produce, it is quite certain that many have not. In France it may be said—no matter how the result has been arrived at, whether by design or natural selection—that the best soils and the best grapes to produce a certain class of wine go hand-in-hand. There is much to be done, it must be

admitted, in Australia before we can arrive at this perfection. Of late years much has already been done which is in the highest degree creditable to our growers, and when some of the vineyards are older, and the soil has become mellower, magnificent wines will no doubt be produced. There is one question, however, in connection with the selection of grapes which may very reasonably be raised, namely, the range of varieties which are grown in Australia. Though some excellent grapes are grown, such as the Cabernet and Shiraz, for dry red wines, the choice is limited. There are many excellent varieties grown in the Gironde and Burgundy districts which are practically, if not quite, unknown in Australia, as, for instance, the Merlot and the Vêrdot, which are universally used in the Gironde district, and others which are grown exclusively in the Burgundy districts. But the point does not altogether end here, for what proportion does Cabernet Sauvignon, for instance, the king, *facile princeps*, of red-wine grapes, bear to other varieties planted? The answer, I fear, will not be by any means so satisfactory as one could wish. The limit of choice of grapes may not perhaps be a very great drawback, as those we have produce wine of fine quality, and there are some vineyards, no doubt, where the best kinds may be found to bear a good proportion to the inferior; but this is certainly not the general rule. The next point to consider is the making and care of the wine. Methods in the colony have no doubt improved enormously of late years, but many of us have still much to learn from the French. In the first place, not enough importance has ordinarily been paid to the right time to pick the grapes, upon which so much depends. In cooler climates the grape may come to maturity for wine-making without practically ever becoming over-ripe, and may, so to speak, remain in a fit condition for wine-making for a much longer period than in a warmer climate, where the changes are very rapid. The desideratum is to ascertain the exact quantity of acidity that is required to make a wine of fine quality—neither too much nor too little. It is most important to bear in mind in this connection that the bouquet and flavor of a wine are entirely derived from the ethers which are formed by a combination of the acids and the alcohol, a process which continues, and is in fact accelerated, after the wines are bottled. Considerable judgment and experience are therefore required to determine the right moment to pick the grapes. In the matter of fermentation, good wines have been made for centuries in certain countries, partly by reason of the climatic conditions at vintage being as a rule favorable, and not because any specially scientific methods have been adopted. But where, as is often the case in Australia, these conditions are not favorable, by reason of too great heat, artificial means must be found for regulating the temperature, in order to encourage the proper saccharine ferments and check the disease germs—a temperature which science approves generally at between 70° to 80° Fahr. In large cellars refrigerators might with great advantage and profit be adopted.

In regard to the care of the wines, the management of a cellar is, as every cellarman knows, composed of a thousand and one little matters, and too much emphasis cannot be laid upon the extreme care and attention which the French cellarman bestows upon his wines; always careful that everything in his cellar is perfectly sweet and clean, and for ever watchful of his wines that no secondary fermentation takes place. An ideal standard for a wine of a Burgundy character is a wine which has not too much acidity, is smooth and soft, without having any perceptible sweetness, yet does not taste dry, and, moreover, is not too alcoholic. To be more exact, the following is an analysis of a South Australian wine which has been very highly spoken of by some of the best judges in the London wine trade, and is appreciated by consumers who know a good wine:—Alcohol, 22 per cent. proof; fixed acid, 0·4 deg., volatile acid, 0·03 deg. (mere trace); sugar, 0·14 deg. (very small); tannin after fining, 0·12 deg.;



mineral matter, partly oxide of iron, 0.25 deg. A wine can only arrive at this state after maturity, during which the superfluous acids and other matters, such as the alkaline salts, are deposited. Hence, unless the wines are matured before bottling, these deposits will continue in the bottles, carrying with them some of the coloring matter. To make such a wine as above described, all these matters are of paramount importance, namely :—(a) Good grapes planted on suitable soils ; (b) the right time to pick the grapes ; (c) good fermentation at the proper temperature, 70 deg. to 80 deg. Fahr.; (d) good cellars in which to mature them ; (e) constant attention and careful handling. These conditions the French either do not require to study, as they are natural ; or, where wanting, they are supplied. The French grower seldom matures his wine himself. As soon as the fermentation has ceased he sells to the merchant, who prepares the wine for the market, and the latter has taken good care to provide himself with adequate, and in many cases princely, premises for the purpose, as witness the magnificent cellars at Bordeaux, Rheims, and elsewhere.

I propose now to examine what ground of complaint there is upon the part of the growers that their vintages have not received the best attention after they have left their hands. In the generality of instances a good case no doubt may be made out for the growers. Their wines certainly have not received the same care which is bestowed upon French wines, either on the part of the merchant or upon that of the consuming public. Australian wines all through the chapter are, so to speak, bottled to-day and drunk to-morrow, whereas foreign wines, on the contrary, are scarcely ever put into consumption until they have received a certain bottle age. Ports are invariably laid down for years before being put on the market. A merchant recently told me that he had an order for a dozen of Australian wine of a certain brand, that he sent to the bottlers for it, and that his man had to wait while the wine was being bottled !

It is true that the consumer does not nowadays lay down his wine to the same extent as used to be the custom, but many do so still ; and, in any case, the wholesale merchant, and often the shipper, holds considerable bottled stocks, which have more or less maturity, in bottle. In England there are practically no stocks of Australian wine in bottle.

Then, again, Australian wines are very largely sold by grocers, who usually have no sufficient storage for wine, and the consequence is they are subjected to injurious temperatures. So far as regards those who buy their wines from the grocer, this is not an unmixed evil, as Australian wines would probably suffer to a less extent than French from this class of maltreatment, and it is probably one reason why they are popular with the grocers. But in a general comparison of the merits of Australian and foreign wines, the verdict being that of the general public, who are in blissful ignorance of the history and career of what they consume, the lack of proper treatment would tell against them, because the public have far greater opportunities of tasting foreign wines that have been properly handled.

The management of the South Australian Government *Depôt* has lost no opportunity of impressing upon merchants the importance of giving the wines a better chance than they have done hitherto, and in some instances with marked success ; there are merchants who can now show Australian wines with a good bottle "smack," and the intrinsic value of these wines is nearly double the value of what it was when they were bottled. Certainly there are many European wines of inferior quality which are sold at double the selling price of these wines, as actual comparisons have shown, both in reds and whites. But the wines must be matured before any attempt is made to lay them down in bottle, otherwise the result will be disastrous, and after twelve months they would probably have to be disgorged.

In conclusion, it is fair to assume that, if our wines are made and handled upon sound principles, which the intelligence of the growers is fully equal to, and with the fine natural advantages with which the colony is blessed, they will not want for a market, and it should "warm our hearts with proud desire of bold-faced victory."

## THE SELECTION AND PLANTING OF FRUIT TREES.

COMPILED BY GEORGE QUINN, INSPECTOR OF FRUIT.

Land intended for planting should be thoroughly prepared some time beforehand, and if it be virgin scrub or forest land a crop of cereals or vegetables should be taken off before planting fruit trees.

Heavy clay soils are not the most suitable for fruit trees, but should such be used provision must be made for under drainage. In all cases the land should be broken up thoroughly, keeping the subsoil in its natural position. In large plantations this is best done by a strong subsoil plough following in the ordinary turning plough's furrow, thus breaking the soil to about 18in. or 20in. deep. Soils that are saturated and boggy in winter in spite of draining should not be planted. Frosts are usually more severe and late in low-lying flats; consequently these should be avoided as far as practicable, and gentle undulations or hillside slopes be chosen.

Peach, apricot, cherry, and all the citrus fruits do not thrive in cold saturated soils, but require well-drained situations. Plums will put up with more moisture in the soil than any other fruits. Pears and quinces may be said to come next, while apples producing fruits of a long-keeping character should not be grown in very damp situations.

In nearly every locality a windbreak is necessary, and if it be at all possible a good belt of trees—not a couple of rows—should be planted; or if natural timber be present, a strip, say of two or three chains wide, should be retained on the sides exposed to cold, cutting, or hot, withering winds. In many places the soil is limited, and paling or galvanized-iron fences may be put up, close to which, on the inside, rows of almonds or loquats should be planted, as they will pay for the space they occupy and give shelter as well. Barrels or sugar baskets are not good protectors, as they tend to "draw" the growths up in a weakly condition.

The ultimate dimensions of the trees should be considered in connection with the soil and other conditions when planting, as in rich soils the trees will grow strongly and spread over a much wider area than in those of a poor quality. For the convenience of working the trees should be planted on the "square" principle. They are then equidistant from each other, and a free passage of light and air is assured.

About 20ft. apart can be taken as a suitable distance to plant apples, pears, plums, cherries, peaches, apricots, oranges, and lemons on the average soils of South Australia, but in richer soils greater spaces are necessary unless the trees are sharply pruned. At 20ft. apart about 108 trees can be set out on an acre; at 24ft., seventy-five trees; and at 30ft., forty-eight trees. In small home gardens, where space is limited, trees may be set at 16ft., or even less, but they require sharp pruning to keep them within bounds.

The season for the autumn planting of citrus trees is too far advanced now, and it is therefore advisable to stay operations until the early spring. Deciduous trees should be got in without delay. They should be purchased from a reliable nurseryman who has a reputation and trade to lose if he defrauds the

purchaser in respect to the accuracy of names, stocks used, &c. In selecting the various trees, see that the plums are worked on myrobalan stocks, not on common plum seedling or suckers. Pears should be on pear seedling stocks, and apples should be double worked or worked on growths from blight-proof roots *not less than 6in above the surface of the ground*. The reason for this is that trees worked lower are apt, if covered by soil or mulch as high as the union, to send out adventitious roots and thus discard the original blight-proof roots. The apricot is best on apricot roots, and peach upon peach, but at the same time, in very dry soils, apricots may be put on almonds, and peaches upon plums for very wet cold localities, but neither can be claimed as a commercial success.

Every precaution against the introduction of pests should be taken, and if the trees on arrival at the orchard could be completely submerged in a strong solution of tobacco and soap mixture for about fifteen minutes much vermin would be avoided. Citrus trees could be treated with strong resin wash to destroy scale insects.

In selecting trees, do not be misled by their sizes, as a medium sized, stout, clean barked tree is always more satisfactory than a skyscraper. A tree composed of one straight clean stem is desirable, as then the grower can cut the stems to a suitable length and form the trunk in keeping with requirements. About "knee high" is a good useful length to sever the stem to frame a sturdy weight-resisting tree. If the tree has been framed, select about three strong, firm branches that radiate at equal degrees from the stem with about 4in. to 6in. between each other and retain these as the main arms. These should be cut back to about two or three good buds. This will avoid the formation of weakly forks, as the arm junctions swell with growth. The roots of the young trees should receive attention. If the trees have been out of the soil for a few hours pretty well all the fibrous roots will perish; consequently under such conditions they should be thinned out carefully. All broken roots should be cleanly severed above the bruise and the cut should be made *beneath or on the under side of the root*.

It is sometimes necessary to put a stake to support young newly-planted trees, but this is not absolutely needful, and may be dispensed with in nicely-sheltered positions. If stakes are used, care should be taken to avoid mutilating the roots when driving them down. They should be on the side of the prevailing wind. On the whole, it may be fairly inferred that only a small proportion of the short-trunked sturdy trees of more recent plantings will require staking.

There are other considerations, such as suitable fencing, to keep out ground vermin, which must be properly attended to if the trees are to be a success.

The following is a list of some of the most suitable trees for planting for commercial purposes. Do not plant a large number of varieties, but confine your attention to a few of the best of each class. Take into consideration any advantages of closeness to markets or proved capabilities of the locality for producing the finest early, medium, or late fruits, and go straight for that particular object. A large collection may, during occasional years, yield the best return, but the grower who finds what he can grow thoroughly well in his particular locality, and specialises on that, will come out top during a run of seasons:—

#### APPLES.

**EARLY** (for Local Markets only).—*Dessert*: Mr. Gladstone, Early Margaret, Irish Peach, Devonshire Quarrenden, Ribston Pippin. *Kitchen*: Mobb's Royal, Lord Nelson, Lord Suffield.

**LATE** (for Export and Keeping).—Cleopatra, Jonathan, London Pippin, Northern Spy, Rome Beauty, Strawberry Pippin, Dunn's Seedling, Stone Pippin, Buncombe.

Should the intending planter be aware that some of the above will not thrive under his peculiar conditions from the following supplementary list others could be selected of good quality :—Dumelow's Seedling, Cox's Orange Pippin, Adams' Pearmain, Esopus Spitzenburgh, Calville Blanche, Cornish Aromatic, New Town Pippin, Pomme de Niede, Shockley, Scarlet Nonpareil, Winter (or Scarlet) Pearmain.

This may appear a formidable list, and a contradiction to the above advice *re* selecting only a few, but it must be distinctly understood that probably in no locality in this colony can more than a dozen of the sorts named herein be brought to the highest state of excellence.

#### PEARS.

**EARLY** (for Local Markets only).—Citron des Carmes, Jargonelle, Doyenne D'Ete, Williams' Bon Chretien (known here as Duchess).

**MID-SEASON** (Local Market).—Poire du Berriays, Beurre Capiaumont, Beurre Diel, Durondeau, Flemish Beauty, Gansell's Bergamot, Marie Louise (shy bearer), Doyenne du Comice.

**WINTER** (Keeping or Export).—Glou Moreau (known here as late Duchess), L'Inconnue, Josephine de Malines, Madame Cole, Vicar of Winkfield (known also here as Napoleon), Winter Nelis (shy bearer), Uvedale's St. Germain, Swan Egg, Catillac.

#### APRICOTS.

**EARLY**.—Oullin's Early Peach (improved), Newcastle Early, Red Masculine, Shipley's Blenheim

**MEDIUM AND LATE**—Moorpark, Hemskirke, Royal, Campbellfield Seedling.

#### CHERRIES.

Early Purple Guigne, Early Twyford, Biggareau Napoleon, Waterloo, St. Margarets.

#### NECTARINES.

**EARLY**.—Hunt's Tawny, Elruge, Irrewaira.

**MEDIUM**.—Shorlands's Tawny, Balgowan.

**LATE**.—Victoria, Stanwick.

#### PEACHES.

**EARLY MARKET**.—*Dessert*: Briggs' Red May, Amsden's June, Alexander's Early, Early Rivers, Early Silver, Hales' Early, Beatrice.

**MID-SEASON**.—*Dessert*: Royal George, Early Crawford, Noblesse.

**AFTER MID-SEASON** (*Dessert, Drying or Canning*).—Sea Eagle, Comet, Salway, Lady Palmerston, Muir, Foster, Elberta, Orange Cling (Nicol's), Lemon Cling.

#### PLUMS.

**EARLY** (for Local Markets).—Rivers' Early Prolific, Early New Orleans, Green Gage, Angelina Burdett.

**MID-SEASON** (*Dessert and Preserving*).—Kirk's, Reine Victoria, Prince Englebert, Washington.

**LATE** (*Drying, Dessert, or Preserving*.—Ickworth Imperatrice, Coe's Golden Drop, Fellemberg, Egg Plum (yellow), French Prune, Pond's Seedling, Jeffersons, Belle de Septembre, Coe's Late Red, Reine Claud du Bavay.

Of the comparatively new Japanese Plums, Simoni, Kelsey, Satsuma, General Saigo, Bohtan, Golden Heart, have all been found to bear freely and their fruits dry fairly well.

**WINDBREAK FOR SEA COAST**.—The cluster pine (*P. pinaster*) will grow in almost pure sand, right close to the sea, and grows very quickly. It produces Bordeaux turpentine.

## ORCHARD NOTES FOR MAY.

By GEORGE QUINN, INSPECTOR OF FRUIT.

The season for harvesting most of our fruit crops has passed, and the time arrived for attention to be given to planting young trees, cultivating the soil, and pruning the deciduous varieties of fruit trees.

In a separate article the former subject has been discussed and needs no further comment. The cultivation, which should begin at this time of the year, has a very important bearing upon the fruit trees in this dry climate. There are not many orchards in this colony that are planted in positions which render the trees liable to injury by excessive moisture; consequently it is of the utmost importance that all the rain which falls upon the surface of the soil should be retained, and allowed to soak down as deeply and evenly as possible.

There is no method at present known by which this can be so thoroughly accomplished as by a good early ploughing. Formerly an advocate of shallow cultivation, I have, during the last few seasons, endeavored to closely watch the results of the two methods as practised in this colony, and have come to the conclusion that deep and early ploughing is the most successful, and enables the trees to bear up against drought much better. One of the advantages of early ploughing is that it causes the rain to soak in much more evenly over the surface of the orchard, thus giving each tree its share. As a rule the tramping down of the surface around the trees, which is occasioned during the fruit harvest, leaves a smoothened and almost impervious sloping floor from which the water runs into the spaces between the trees or to any lower spot. The ploughing which is given now should throw the soil away from the tree stems, so that if it becomes saturated sufficiently to allow the water to run in the furrows it may be conducted along the rows instead of midway between them. There are a few orchards in this colony planted in low-lying spots, where, if this rule be practised, damage to the roots through excessive cold and moisture would ensue; consequently the opposite course has to be pursued, and the soil ploughed towards the stems, so that when completed the trees stand each on a mound, and a furrow drain runs midway between each row of trees, but these instances are few indeed.

There is not space in brief notes of this kind to enter fully into the subject of pruning fruit trees, but one very important consideration may be mentioned in connection with the bearing the past dry summer must have upon our pruning operations. Many of the different sorts of trees in the districts most seriously affected by drought have made scanty growth, and until the rains of a few weeks ago the formation of fruit buds seemed to be hopelessly checked, as the foliage began to fall from the trees; but the rain has had a wonderful effect upon the trees, and some hopes of a moderate percentage of developed fruit buds being now in view, the trees should be encouraged to hold their foliage as long as possible, so that the delayed buds may ripen.

This assistance can best be given by refraining from pruning while the foliage adheres to the twigs; the buds will then get a complete share of the lingering vegetation until it finally ceases for the season.

It will be noted that very little growth of new branches has been made by many trees, and, arguing generally, it may fairly be inferred that root-action has almost ceased, causing many of the smaller sensitive fibres to perish. This is a bad condition for trees to reach, and indicates a backward movement unless measures are taken to check the same. Where a light pruning is given much lateral growth—chiefly fruit wood—will die back, and will have to be removed in the course of a couple of seasons, and at the same time growth at the points of leading shoots are checked. The only way to rectify matters where

these conditions prevail is to prune hard, recover the balance between roots and branches, and thus assist the trees to regain lost ground.

The present is a very good time to apply a dressing of a slowly-dissolving manure, such as bonedust, as the moisture in the ground during the winter renders a large portion of the manurial qualities available to the plants in spring, when vegetation begins, and a drain upon the plant-food of the soil commences.

The ties on budded stock should be examined, and where the buds have "taken" the binding may be removed, but still refrain from cutting away the stock above the "bud" which has been inserted. Stones of peach and apricot should be put in as soon as possible, if a regular germination is desired.

As the winter goes on, and the bark is softened by moisture, every opportunity should be taken to scrape away the rough dead bark from the stems of all apple, pear, and quince trees in gardens where the codlin moth has made its appearance. Such scrapings should be caught as they fall and burnt at once. All bandages must now be removed from the above-named trees, and be either burnt or disinfected with sulphur fumes or boiling water, after which any that are sound should be preserved for next season.

## NOTES ON VEGETABLE-GROWING FOR MAY.

BY GEORGE QUINN.

The rain showers and the mild sunshine having followed each other in regular succession during April, most early crops of vegetables are now making splendid progress. So are all kinds of weeds, and no time must be lost now in using the hoe freely before the weeds damage the crops by stealing their food and crowding them out of a proper supply of sunlight and fresh air. Opinions differ on the types of hoes to use in a vegetable garden. My leanings and practices prejudice me in favor of the Dutch or "push" types in preference to "chopping" hoes. The user of a Dutch hoe need not tread upon the ground after breaking it up, and this is very important, as the weeds lie loosely upon the surface and the sun and wind soon kills them, while a more complete aeration of the soil is accomplished.

Where crops are in active growth a light top-dressing of such manures as sulphate of ammonia, superphosphate, and guano, sprinkled along the rows prior to hoeing, so that it is gently worked into the soil, will prove of great benefit. These very soluble manures are of the greatest benefit to vegetable crops when several light dressings are given in this manner during the growing period, as the plants are in a fit condition to utilise practically the whole of the fertilising elements. Growing crops of turnips, swedes, carrots, parsnips, beets, lettuces, radishes, and spinach should be thinned carefully, and as far as the root crops are concerned the ultimate dimensions of the roots must be borne in mind when this work is in progress.

Potato crops should be hoed now and mounded up. The old stems require to be cut away from asparagus beds, and the surfaces of these and rhubarb beds dressed with well-rotted manure.

Transplantings of cabbage, cauliflower, broccoli, kohlrabi, celery, onions, beets, &c., may still be carried on vigorously.

During the wet cold winter months peas and potatoes do not thrive, and frosts are apt to destroy the blooms of the former and tops of the latter; consequently sowings and plantings should be finished for early crops.

Sowings should still be made in seed beds of onion, leek, cabbage, cauliflower, lettuce, beets, &c., and in the open continue sowing broad beans, carrots, parsnips, prickly spinach.

Late-fruiting tomato plants should be trimmed out, and the fruits exposed to the sun as much as possible—otherwise they will not ripen, or fully developed fruits may be gathered and placed in a sunny position to ripen. Unless diseases have been noted upon them, the old haulms of melons, tomatoes, French beans, and any other summer vegetables should be heaped together and rotted down for manurial purposes. Continue to stake peas well up off the wet ground, and do not hoe too closely to the stems of these plants.

The earthing up of celery for blanching purposes must be closely watched and performed from time to time, only permitting the topmost foliage to be uncovered. It is a good practice to fold some strong paper or other soft substance around the stems before banking the soil around them, as by this means particles of earth are prevented from falling down between the fleshy stems. Of course great care in folding the stems closely back into their natural positions will avert this, but much longer time is required at each earthing up.

## PURCHASE OF PHOSPHATIC FERTILISERS.

The Tynesidè manure merchants (England) have issued a warning to purchasers of phosphatic manures, which bears out in every particular the utterances by Professor Lowrie, Roseworthy Agricultural College, South Australia, upon the same subject. All phosphatic manures are valued for the *soluble* phosphoric acid contained in them—that is, soluble in water. The insoluble phosphoric acid is not at once available for the crop, but may in course of time be rendered available through action of the acids of the soil and atmosphere, and no account should be taken of the presence of *insoluble* phosphoric acid when purchasing the fertiliser. The amount of *insoluble* phosphoric acid in such fertilisers may be as much as 2 or 3 per cent., and unscrupulous manure merchants are in the habit of adding the *insoluble* to the *soluble* phosphoric acid contents of their fertilisers, whilst the honest merchant separates the two in his statement of analysis, so that, whilst his article may really be exactly similar to that of his rival in business, it is made to appear much poorer, and the opponent receives a higher price. Speaking of superphosphates, the merchants say :—

The commercial value of a superphosphate entirely depends upon its guaranteed minimum percentage of soluble phosphate, though all superphosphates, of whatever strength, contain at the very least 2 per cent. of insoluble phosphate. Some unscrupulous dealers, however, by adding the soluble and insoluble phosphates together convey an entirely false impression of the strength of the manure, and secure for themselves thereby at least an extra 2s. 6d. per ton profit. A superphosphate, for example, of 28 to 30 per cent. soluble phosphate and 2 to 3 per cent. insoluble phosphate contain a total of 30 to 33 per cent. phosphates lime, but is only sold by the manufacturer as a 28 per cent. manure. A superphosphate invoice, therefore,

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Farmers are con-

sequently warned against accepting invoices of this character, which are usually intended not only to make the superphosphates appear of higher analysis and commercial value than they really are, but to handicap the honest dealer who strictly retails the same strength as he himself purchases wholesale. This warning, however, does not invariably apply to bone manures.

**TARES OR VETCHES.**—These plants are legumes, and help to enrich the soil with nitrogen—the most valuable and costly ingredient in the land. They do well on a lime soil. The seed may be drilled or harrowed in, and April or May are the proper months to sow. Two bushels of seed, together with 1 bush. of rye or oats will be sufficient. The latter plants serve for the legumes to climb upon.

## HOUSEHOLD PARLIAMENTS.

None others of our Branches have yet followed the example of that of Millicent by establishing Household Parliaments, consisting of mothers, fathers, daughters, and sons willing to meet at certain fixed periods to exchange practical ideas and useful recipes, as well as to exhibit and test examples of each others' products and handiwork. This is a really valuable innovation, and most worthy of consideration by every Branch of the Bureau. A quarterly meeting of all the families and friends of members of each of the Branches would give an astonishing impetus to the work and practical usefulness of the Bureau, and help to lighten the monotony of life for the younger people. At Millicent the meetings are held monthly. A lady usually presides, some member generally reads a practical paper upon some household subject, and several members will hand in recipes that have been tested and proved to be good. At intervals the members hold a social.

The General Secretary of the Bureau desires that members will take this matter into earnest consideration, and take steps, if approved, for the inauguration of a Household Parliament for each particular Branch. The wisdom of our 1,500 members will most probably suggest improvements upon the constitution and method of working of these Household Parliaments.

## HOUSEHOLD HINTS.

**PICKLED GREEN TOMATOES.**—These make a very nice pickle. Prepare a pickle in proportions as follows:—Malt vinegar, 2 pints; brown sugar, 5lbs.; bruised cinnamon paste, 1oz.; bruised cloves, ½oz.; bruised capsicums, ½oz. Boil the vinegar and spices for ten minutes, then dissolve the sugar in the liquor, strain through flannel to remove the spices, and boil the liquor. Meanwhile the green tomatoes should have been selected, cleansed, remove the stems, cut into slices half an inch thick, place on dish and sprinkle liberally with salt on each layer, let stand twelve to fifteen hours. Then drain, place in an enamelled pan with fresh water over a fire. Change water several times to extract excess salt. When thoroughly scalded and partly cooled strain off the water and place in the boiling syrup above-mentioned, simmer until tender, then lift out the slices and place in jars. Next day draw off the pickle, boil again, and pour boiling hot over the slices, and tie down when cool.

**PICKLED CUCUMBERS.**—In Russia, Germany, and America thousands of acres are cultivated for pickling cucumbers alone. The "cukes" are from 1½ in. to 4 in. long, medium between these sizes being most in demand. A strong supersaturated solution of salt in pure soft water (brine strong enough to float an egg) is all that is wanted for pickling the fruits. Gather them after the dew is off and before they get hot, place them in the cask, pour the brine over till they can be perfectly covered with it, place a board on top to keep the "cukes" under, and *do not* use any iron or limestone as a weight. The best thing is a piece of stick to prop the board down on the fruit. Keep the barrel in a cool place, and add more salt as the brine becomes weakened by "exosmosis" of the watery part of the fruit and absorption of the salt.

**TO PRESERVE QUINCES.**—Take large quinces, wipe, peel, core, and slice them, or cut into quarters. Directly the slices or quarters are cut place them in cold water to which 1oz. common salt to the gallon has been added. This is to preserve the color. When enough is ready for preserving place in the pan and cover with boiling water. Simmer gently until tender. When tender, lift with a skimmer and slide on to flat dishes. Continue boiling the quinces in the same water until they are cooked. Put the parings and rough pieces in the same



water in which you have cooked the quinces, and simmer gently one hour, keeping closely covered all the time; then strain and measure, and to every pint of liquid allow 1lb. of sugar. Stir over the fire until the sugar is dissolved; bring quickly to a boil; boil rapidly ten minutes, skimming as the scum comes to the surface. Now put in the quinces, and boil until they are clear, tender, and red. If you wish them bright-colored keep the kettle close covered while the quinces are in. When done lift into glasses or jars, give the syrup another boil until it jellies, pour it over the quinces, and stand aside to cool. When cold tie up.

TO DESTROY MICE, COCKROACHES, &c.—One of the simplest and most effectual means of getting rid of these pests from the house is a mixture of equal parts of plaster of Paris and flour. This must be kept dry, and placed in small receptacles about the places infested. The vermin attracted by the flour, swallow a quantity of the plaster of Paris, which on coming in contact with the moisture in the stomach sets hard, causing acute indigestion and death. Mice destroyed by this means cause no unpleasant smell about the house.

## THE FARM.

### SEASONABLE NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,  
ROSEWORTHY, SOUTH AUSTRALIA.

The clouds consign their treasures to the fields at last, and farmers "looking lively gratitude" can proceed with seeding operations. Whoso has not sold his hay will regret his holding it; but the promising opening of the season will soften the "I told you so" from the neighbor who has realised. We have had on the College Farm 2·87in. of rain during the month; vegetation has burst forth rapidly, and feed growing apace promises a good lambing season. Fallows, though cleaner than last year, are showing a good germination of weeds as an earnest of clean crops this season. I notice that fallows are open, and are demanding more harrowing than in some seasons—harrowing not simply to secure a tilth, for that is good, but by way of sufficiently consolidating the soil as a seed bed.

Wheat put in some weeks ago is through and looking healthy. It is growing so rapidly as the ground is so warm that there will be a tendency for it to become proud. Early wheats especially will, I think, be prone this season to shoot up with few stems. If we get good rains again shortly this tendency may not be in evidence, but if the weather becomes dry again we will have crops badly tillered. When crops exhibit symptoms of becoming too rank, when they do not tiller sufficiently, and they begin to grow proud it is well to have them fed down with sheep. In an early season this feeding down can often be done with much advantage to the crop, especially on light land, where the treading of the sheep is often better than the heaviest rolling. But feeding down is not to be practised in this colony without discretion and careful cogitation, for the dry springs or early summers from which we so often suffer play havoc with a crop that has been fed down late. Only early or very rank crops should, I think, be fed down, and the feeding down should be done by a shepherded flock so that it may be grazed evenly. To turn in sheep in wheat, shut the gates, and leave them may prove disastrous work, as parts of the crop may be fed quite bare while other parts may be scarcely touched, and the last state of that crop will be worse than the first. Early-sown crops may be harrowed during the latter part of May. A good harrowing to the crop is almost invariably

beneficial. It is to be considered a very important operation, and should be carried out boldly and energetically on land that is heavy and has a tendency to set hard. It opens the surface and lessens evaporation from the land; it allows a better circulation of the air in the surface soil; it mulches, so to speak, the young wheat with soil; it brings about greater tillering or stooling; and it destroys many weeds which are but in their first leaves and are not firmly rooted. Harrowing can be done in May, June, July, or August, according to the climate of the district, and in the South-East it should be carried out in the spring. In this district in an average winter the land is too soft in the end of June, in July, and in August to allow of a team working over the crop; hence if harrowing is not done early it cannot be done at all. But later seeding cannot of course be neglected in favor of harrowing early-sown crops, and when seeding is over early fallowing demands attention, so that unless a man has a relatively large number of horses he has no option but to neglect some of the harrowing. In this climate one almost requires to double-bank his working teams during May, June, July, and August. I often think that it would pay handsomely to buy teams in April in excess of what are required the other eight months of the year and sell again at the end of August or in September. On this farm I believe it would pay handsomely to put on an extra ten horses for these four months, even though they brought a total of £60 or £80 less when sold than was paid for them when purchased, and this would not often occur. One bushel per acre over the 500 acres of crop would not I know measure the gain resulting from having seed in earlier and harrowing and fallowing done betimes. Last winter allowed of harrowing at midwinter or later, and I noticed a distinct gain where it was done. In harrowing one should not be nervous about over-doing the good thing. I have seen crops that seemed almost buried alive—harrowed out of sight almost—which benefited much by the apparent rough treatment. On light lands of course one has to think twice before harrowing, because the soil already open is so easily moved that the crop may suffer. In France what is called *ploutrage* is practised on light lands instead of harrowing; it is simply a levelling of the surface soil, not by rolling, but by dragging harrows turned upside down over the crop. Instead of harrows so placed a heavy rail is often drawn over light lands. The harrowing should be done at right angles to the drilling, and if the land has not been harrowed after the drill at seed time the crest of the little ridge between the rows of plants will be found to “fly” readily under the harrows in suitable weather.

I will now follow up as promised notes for last month on manures, and will indicate briefly the mode of valuation of some manures. Of course it is understood that the valuation of a manure may not be its absolute relative value. To determine this experiments have been conducted in different countries, but the results are not yet sufficiently definite or decisive to admit of valuations being so based, and, accordingly, such valuations as are made are based on the market values of the different manures prevailing for the time being. In last month's *Journal* this season's prices of various manures was quoted. I will take the prices there given as the basis for the following valuations:—English superphosphate (mineral), 35 to 38 per cent., rendered soluble, is quoted at £5 per ton. Therefore, taking 36 per cent. as the average, we get 2s. 9½d. as the price of the unit, or each 1 per cent. rendered soluble for £ $\frac{1}{10}$  = 2s. 9½d. nearly. In the same list English superphosphate 26 per cent. rendered soluble is quoted at £4 10s. per ton. This is much dearer than 36 per cent. at £5, for  $\frac{1}{10}$  = 3s. 5½d. nearly. The sample quoted at £4 10s. is worth, relatively to that quoted at £5, only £3 12s. per ton, for 2s. 9½d.  $\times$  26 = £3 12s. The second sample (26 per cent.) is worth less per unit than the first sample (36 per cent.), as the freight per ton and the cost of

handling on the farm per ton is the same, though it contains 10 per cent. less of the fertilising material for which it is purchased. To purchase the second sample in preference to the first is one way in which some farmers, who do not take the trouble to study quality, can increase their outlay unnecessarily to the extent practically of £1 per ton of the stuff purchased. To these few superphosphate is all one quality, and as £4 10s. per ton is less than £5 per ton, they reason that this lower-priced stuff must be the better bargain, and they buy it accordingly, while it is in reality 18s. to £1 per ton dearer than that for which the higher figure is quoted.

Before leaving this example it may be well to look at it in another way and to point out that if 26 per cent. quality were worth £4 10s. then 36 per cent. quality would be worth £6 5s. or more. There should therefore be no hesitation as to which of the two qualities cited is the better to purchase.

I will now instance the valuation of a manure containing more than one manurial constituent, and take as an example a quotation for dissolved Peruvian guano. The analysis is given as follows:—

Tribasic phosphate made soluble = 20 per cent.  
 Tribasic phosphate insoluble = 2·5 per cent.  
 Ammonia = 6·25 per cent.  
 Potash = 2·73 per cent.

The unit of tribasic phosphate made soluble in such guano has a higher value than the unit equivalent in mineral superphosphate, and we may set it down at 3s. 2d.

The unit of ammonia may be obtained from sulphate of ammonia, of which ammonia is about 25 per cent., and which is quoted from £11 to £12 per ton. At £12 per ton the value of the unit =  $\frac{£12}{25} = 9s. 7d.$ , but ammonia in Peruvian guano is generally rated a little higher, and may be taken at 10s.

The unit of potash may be obtained by dividing the price of kainit, sulphate of potash, or muriate of potash, respectively, by the percentage of potash in it. Kainit, for example, is quoted at £4, and as it contains about 13 per cent. of potash the value of the unit is  $\frac{£4}{13} = 6/1$ . In sulphate of potash it can be obtained at a price of about 5s. 6d. per unit. These are very high values for the unit of potash but it is not quoted in any form much lower. It is worth pointing out, however, that at these prices wood ashes are worth from 35s. to 45s. per ton, and while these prices are asked very little potash is likely to be used. If the unit values, as above, be taken, the value of this dissolved Peruvian guano is calculated thus:—

3s. 2d.	×	20·0	=	£3	3	4
1s. 6d.	×	2·5	=	0	3	9
10s.	×	6·25	=	3	2	6
5s. 6d.	×	2·73	=	0	15	0
				<hr/>		
				£7 4 7		

Manures of this character are quoted at prices far in excess of this amount—from £12 to £14 per ton. Farmers have a leaning to Peruvian guano or products from it, and the price is kept high accordingly; but I have given this example to indicate that it is as a rule considerable cheaper for farmers to purchase the manurial ingredients in different manures and compound their own mixtures.

These valuations serve or ought to serve another purpose, viz., to indicate to farmers that if they are to use artificial manures to any extent a knowledge of elementary chemistry is necessary for the exact well-informed business of farming (this relation of chemistry with agriculture is only one of many), and that it becomes the duty of those who propose that their sons shall become farmers to give them in their youth an opportunity of acquiring some knowledge of elementary science.

## FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford &amp; Company report:—

April 30th, 1898.

At last we are able to report prospects of a favorable season, the delayed autumnal rains having set in on the first day of April, since when we have had mill, growing weather, occasional showers giving 3in. to 4in. during the month in most places, although in the west coastal districts and the northern areas the fall has been light. The subsoil, however, has not yet had a thorough soaking, even in the most favored spots, but as our usually wet months are still ahead of us conditions are encouraging and extremely favorable compared with corresponding period of late years.

The threatened rupture between America and Spain during the earlier part of the month caused considerable activity in the breadstuffs market throughout the colonies, a lot of business in wheat being put through at 2d. to 3d. advance on our last month's quotations. The actual break-out of hostilities during the past week, however, has almost stopped operations, so that the present rate of 6s. for wheat here may be looked upon as only nominal, no business at the moment passing through, and millers are working on their stocks bought previous to the rise; otherwise as the figure for wheat named flour would be up to £12. The advance in European markets of 4s. per quarter, which means buyers paying up to 43s. 6d. there, apparently justifies the local rates ruling, particularly in this colony with our small available stocks. The official agricultural statistics have been published, bearing out the *Register's* forecast of 33bush., which appeared in our March issue, the Government figures making the average yield of wheat reaped 3bush. 52lbs. Millers' offer lines remain unchanged, but there are no stocks, particularly in pollard, being carried. There is a firming tone in hay and chaff, as the continuance of drought in New South Wales and Victoria renders it probable that our farmers will soon be able to find an export outlet. In feeding grains a quiet month's business has been experienced, with quotations unaltered.

Potatoes.—The market has been supplied in increasing proportion by importations, but prices have receded. Barely a couple of months' supply now exists in this colony, so that for some time to come we shall have to depend largely upon intercolonial sources, New Zealand being offered in the market for May delivery. The supply of onions is narrowed down to two districts which yield better keeping quality; prices therefore have improved and appearances point to the probability of further advance in this line.

In dairy produce business has been very brisk. In spite of heavy importations of butter by seaboard, and cream overland from Victoria, the continued shrinkage in local supplies caused prices to steadily advance until a record for three years was reached about the middle of the month, since when, owing to heavier importations and an improving local output, influenced by the mild weather that prevailed, prices again eased down, so that during the past ten days values of local factory butter lines have given way 4d. to 5d. per pound, imported bulk receding fully 1d. At the moment intercolonial markets are somewhat weaker, but with the setting in of wintry weather, which may now be expected, no serious collapse in value should take place. At the beginning of the month eggs had declined slightly on previous closing rates. For a couple of weeks, however, the market ruled uneven, when heavy orders from Western Australia again set prices going, so that within the past ten days a rise of 5d. per dozen has been made, with supplies considerably short of orders. Honey has been a little easier; beeswax brisk; almonds quiet. The shrinkage in stocks of cheese has caused values in this line to further advance, but we consider the limit is now reached. Bacon has been more plentiful and has receded about 4d. in the pound; stocks, however, are high, and as the live material is none too plentiful we do not expect much reduction even during the usually slack winter season in this line. The poultry sales during the month have been on the whole very satisfactory, good demand continuing for all suitable table fowls, ducks, and geese, whilst turkeys within the last week or so have recovered considerably from the extremely low prices prevailing a month ago.

## MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, nominally 5s. per bushel of 60lbs.

Flour.—£11 10s. per ton of 2,000lbs.

Bran.—1s.

Pollard.—1s. 2d. per bushel of 20lbs.

Oats.—Local Algerian and dun, 2s. 3d. to 2s. 6d.; good stout white feed, 3s. 3d. to 3s. 6d. per bushel of 40lbs.

Barley.—Malting, 4s. to 5s.; feeding sorts, 3s. 3d. to 3s. 6d. per bushel of 50lbs.

Malt.—Local, 8s. 6d. to 9s. 6d. per bushel of 40lbs.

Chaff.—£3 12s. 6d. to £4 per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.

Potatoes.—Mount Gambiers, £7 to £7 2s. 6d. per ton; Tasmanians, £7 7s. 6d. to £7 15s. per 2,240lbs.

Onions.—£6 to £6 10s. per 2,240lbs.

Butter.—Creamery and factory prints, 1s. 5½d. to 1s. 7½d.; dairy and collectors' lines, 1s to 1s. 4d. per pound.

Cheese.—S.A. factory, large to loaf, 8½d. to 9½d. per pound.

Bacon.—Factory cured sides, 8½d. to 9d.; farm lots, 7½d. to 8d. per pound.

Hams.—S.A. factory, 9d. to 10d. per pound.

Eggs.—Loose, 1s. 5½d.; in casks, f.o.b., 1s. 7d. per dozen.

Lard.—In bladders, 7d. to 7½d.; tins, 6½d. to 6¾d. per pound.

Honey.—3½d. for best extracted, in 60lb. tins; beeswax, 1s. 2d. pound.

Almonds.—Soft shells, 3d.; kernels, 6d. per pound.

Gum.—Best clear wattle, 2d. per pound.

Poultry.—Fair to good hens, 1s. to 1s. 2d. each; poor to ordinary, 9d. to 11d.; roosters, up to 1d. 8d. for good table birds; ducks, 2s. 2d. to 2s. 4d.; pigeons, 5d.; geese, 2s. 10d. to 4s.; turkeys, 5½d. to 6½d. per pound live weight.

## WEATHER AND CROP REPORTS.

AMYTON.—Seeding operations finished, except that a few are waiting for a good fall of rain, which is badly needed. The rain so far has done more harm than good, being enough to germinate some of the grain without bringing it up. Feed is scarce. Rainfall for month, 0.650in.

ANGASTON.—The vintage is finished, and the fruit crop stored. Splendid rains have fallen, and feed is coming on nicely, though retarded considerably by frosty nights. Much damage has been done in the gardens by heavy frost. Stock in good condition, and lambing season giving great promise.

APPILA-YARKOWIE.—We have had nice rains during the month, soaking the soil. Seeding is in full swing under favorable conditions. Rainfall for February, 1.900in.; March, 0.920in.; in April, to 14th, 1.710in.

BALAKLAVA.—Splendid rains fell on April 2nd and following days, from ½in. in northern to 1in. in southern portion of district, and two weeks later 1½in. fell. Farmers are jubilant, and, though some are waiting for the rubbish to start, seeding operations generally have commenced. There will be a very large area in this district put in with the seed and fertiliser drill. A slight frost was experienced on the 20th, but not sufficient to injure the young grass, and if no sharp frost occurs for a time there will be good early feed.

CALCA.—The weather has been rather boisterous; 0.730in. of rain fell on April 2nd, but since the weather has been sultry and threatening. Sowing is now general, feed is scarce, and stock poor.

CARRINGTON.—Seeding operations finished under unfavorable conditions, nearly all seed being put in in dry soil. The rains have been insufficient to start the weeds; crops will be dirty. Rainfall for March, nil; April, 0.750in. At least 2in. of rain are required to give the ground a good soaking. Stock are keeping in fair condition on the annual saltbush, but as this will soon be done they will have to be removed to better pasture unless good rains come very soon.

CHEERY GARDENS.—Splendid rains have fallen during the month, over 3in. altogether, putting the land in good condition for cultivating. Hay and pea crops will consequently be put in in good time.

CLARENDON.—Vintage just finished, the yield being below the average. Splendid rains have fallen during past few weeks, about 5in., and grass is growing fast. Crops for green feed coming on well. Ploughing pretty general, and seed will be in early. Appearances point to a good season.

DAWSON.—Rainfall for March only 1in.; total for year to April 24, less than 2in. Country again in very bad condition owing to scarcity of feed. A good general rain is required to save another bad winter. Seed operations completed, but owing to the light rains much of the seed is already spoiled, and, owing to there being no chance of cleaning the land during past three seasons, weeds are likely to be numerous and troublesome with a fair fall of rain. Large numbers of horses are dying from sand, worms, and other ill effects of past year's hardships.

EUDUNDA.—March was very dry, only 0.130in. of rain falling. The season has, however, considerably improved, the rainfall for April to 20th being 1.798in. Farmers are busy seeding. Stock in good condition.

GAWLER RIVER.—Rainfall for March 0.430in. Insufficient to start the feed. Nearly 2in. fell in first week in April, and another inch on the 16th, bringing on the grass, which is growing very fast. Stock and sheep in fair condition. Early green crops doing well. Seeding commencing under good conditions. Summer crops a total failure. Kaffir corn and Jersey tree kale have proved very hardy. Oranges free from scale and promising well.

KAPUNDA.—Rainfall for first three months of year 2.360in., and another good fall in April, making things very promising. Green feed growing very rapidly, and working stock

looking well. Most of the ploughed land has a thick crop of wild oats just through, which will give farmers an opportunity of turning the rubbish under before seeding, and securing a clean crop.

**LUCINDALE.**—Glorious rains have fallen throughout the district within the last fortnight, and, as the early lambing flocks will soon be lambing, a good commencement is made for a good season for these. Green feed crops are looking well, and ploughing is now well forward.

**MAITLAND.**—Splendid rains (about 2·700in.) have brightened our prospects and stopped water-carting. This will also bring up the weeds, and allow an opportunity of cleaning dirty land. Most of the crops will be put in with the seed and fertiliser drill, nearly 2,000 tons of manure having been brought into this district for use this season. Several vinegrowers are rooting up their vines, as there is no sale here for other than table grapes. Stock are in fair condition, and feed is growing rapidly.

**MILLICENT.**—The weather this month has been everything that could be desired, good seasonable rains having fallen, and but very slight signs of frost. The green feed (rye and barley) is growing well, and the grass has got a splendid start. Farmers are busy ploughing. Rain this month, to date, 2·810.

**MOUNT COMPASS.**—Splendid rains have fallen during the month, the best for six months. Some late potato crops look very well, but unless something unforeseen happens they will be cut by the frost. Stock are falling off in condition very fast.

**MOUNT REMARKABLE.**—The prospects for an early season are more favorable than we have had for four years. Rainfall for three weeks of April, 3·260in. Farmers are jubilant, and busy seeding. Grazing paddocks are quite green, and where there is any dry grass as shelter the young grass is 2in. or 3in. high.

**MURRAY BRIDGE.**—The weather of late has been all that could be desired; rainfall for three weeks over 2in., with intervals of warm sunny days. Grass is growing well, and ploughing is in full swing. Stock in fair condition; the lambing promises to be good.

**MYLOR.**—Crops generally are looking well, and blockers are busy putting in green feed. Rainfall for April, to 22nd, 2·871in.

**ONETREE HILL.**—The weather during the last fortnight has been very mild, and with the splendid rain that has fallen the grass is growing very quickly. Seeding has not yet commenced, farmers waiting for the weeds to grow, so as to be able to kill them when putting in their crops. Stock are improving in condition. Rainfall for March, 0·400in.; to April 20th, 3·965in.

**PINE FOREST.**—We have been favored with another nice fall of rain, making the total for past three weeks 1·680in. Feed and early sown wheat on new land growing splendidly.

**PORT LINCOLN.**—The late rain has started the grass, but unless another fall occurs soon there will be but a poor lookout for the early lambs. Much of the land is too hard to plough, and at least 1½in. of rain is needed to start seeding operations. Stock are looking well.

**REDFHILL.**—Rainfall since previous report 1·290in. The recent rain has started the rubbish on the slopes, but more is required for the flats. Seeding operations general. Stock in good condition. Grass growing fast where sheltered by the old grass, and with another fall of rain at an early date there will be abundance of feed.

**SADDLEWORTH.**—With the exception of a few light showers at the opening, March remained a dry month. The very welcome rains since will give an opportunity this year to clean the fallows well before seeding, without leaving that work too late. Sorghum crops are finished, and the winter feeding of dairy stock has begun. Rainfall for March, 0·250in.; April, 2½in. to 20th.

**WOODSIDE.**—The splendid rains that fell at the end of February gave the grass a good start, and also the crops sown for green feed, and the rain on the 2nd April was just in time to save things from drying up. Another good fall occurred on the 17th April; so the season has commenced well, and all vegetation is looking splendid. Ploughing now in full swing.

## AGRICULTURAL BUREAU CONFERENCE AT STRATHALBYN.

The Sixth Annual Conference of Southern Branches of the Agricultural Bureau was held at Strathalbyn on Thursday, March 31, there being a good attendance of delegates and visitors.

Delegates from the following Bureaus were present:—Central Bureau, Cherry Gardens, Clarendon, Finnis, Forest Range, Hahndorf, Hartley, Kanmantoo, Meadows, Murray Bridge, Mylor, Willunga, Woodside, and Strathalbyn—fifty-six members in all.

### Exhibits.

A fairly large show of produce was tabled. Mrs. W. A. Sunman and Mrs. W. J. Stone, both of Bull's Creek, showed splendid collections of jams, jellies, sauces, pickles, and other samples of home industries. Other exhibits comprised specimens of apples, lemons, oranges, quinces, tomatoes, potatoes, melons, cucumbers, &c., lucern, tobacco, cereals, sorghum, maize, &c. Mr. W. M. Rankine showed two large melons, each weighing over 50lbs., grown without irrigation.

### MORNING SESSION.

Mr. F. E. H. W. KRICHAUFF, Chairman of Central Bureau, occupied the chair, and read the following paper:—

### Commercial Fertilisers for Vegetables and Fruit.

Mr. J. J. Willis read a paper in April, 1897, before the Royal Horticultural Society of London, wherein he deprecates the astonishing ignorance or want of consideration when applying manure, and especially the so-called artificial manures. The same mismanagement, no doubt, can be found in South Australia, as the value and methods of using these fertilisers are but little understood. Many of them have but lately found a market here. We find gardens and orchards dressed with large quantities of stable manure or vegetable composts which sometimes contain but little real plant food, but require a large amount of labor in collecting, carting, and distributing, or there is a waste of certain ingredients from excessive manuring with such materials which would be much more useful by an admixture with suitable artificial manures. Twenty tons of good farmyard manure will not produce so large a crop of cucumbers as 150lbs. of nitrate of soda, provided the soil is not deficient in available mineral salts. The 20 tons may or may not contain more than 200lbs. of nitrogen, while the 150lbs. of nitrate will contain only 23½lbs. And why do not the 200lbs. effect as much for the crop as the 23½lbs.? Simply because the nitrogen in the farmyard manure is in the form of an organic compound and has to be converted into nitrate of lime before the cucumbers or other plants can use it, while the nitrate of soda is at once available. This is clearly shown if used as a top dressing, when a small quantity only is applied at different times, and yet the effect at once indicates how exceedingly soluble a plant food it is. Farmyard manure, which we all admit renders the condition of the soil more porous and capable of holding a greater amount of moisture, requires more frequent and heavier rains than South Australia in too many localities gets. In a fresh condition 1 ton of 2,240lbs. of the following vegetables contains the following constituents in pounds. Weight for weight the refuse portion of vegetables, which we ought to return to the soil, abstracts from the soil more plant food than the marketable portion, as can also be seen from the following table:—

	Dry Substance.	Nitrogen	Ash.			Water.
			Total.	Containing Potash.	Containing Phosphoric Acid.	
Cabbage—Head of ..... lbs.	224	6	21	10	4	1,989
Stem of ..... "	246	5	35	13	3	1,954
Potatoes—Tuber of .... "	515	8	21	13	4	1,696
Haulms of .... "	1,919	11	44	22	8	266
Carrots—Roots of ..... "	336	5	18	7	3	1,881
Leaves of .... "	399	11	54	6	2	1,776
Pears—Seeds and pods of .. "	1,919	80	52	23	19	189
Vines of ..... "	1,881	23	97	22	8	239
Onions—Bulbs of ..... "	314	6	17	5	3	1,903
Celery ..... "	356	5	39	17	5	1,840
Asparagus ..... "	150	7	11	3	2	2,072
Lettuce ..... "	134	5	18	8	2	2,083

We observe from this table how very largely most of the vegetables are composed of water, and a sufficiency of moisture is therefore absolutely necessary to ensure a vigorous and uninterrupted growth if we wish to obtain good quality as well as quantity from our crops. Each plant has especial wants: Succulent and rapidly-growing vegetables require much nitrogen in available form during the whole time of their growth; flowers and fruit trees require phosphatic food when blooming and developing seeds and fruits, which is too often

withheld at the critical time for the setting of the fruit; grapes need a large amount of available potash to produce rich and sugary juice; potatoes require nitrogen and potash for the production of starch in the tubers. In the above table the quantity of ash is greater than the potash and phosphoric acid added together, but the ash contains also soda, magnesia, lime, sulphuric acid, oxide of iron, chlorine, &c., which ingredients are seldom wanting in fertile soils; but these are of little importance, while a large excess of nitrogen, potash, and phosphoric acid should always be in the soil. It is, however, surprising what a difference we find in the ashes of the wood and of the fruits of our orchards. For the forming of wood lime is most important: Cherry trees require 28.7 per cent.; raspberries, 38.2 per cent.; apples, 63.6 per cent.; pears, 77.2 per cent.; while the fruit of the apple consumes 46.2 per cent. of potash, and the others from 50 per cent. to 54.7 per cent. Provided potash and phosphoric acid are not deficient in the soil vines require nitrogen to produce sufficient sugar in the grapes. More than 2 tons of organic matter, 105lbs. of nitrogen and 463lbs. of mineral ingredients—chiefly lime and potash—are required per acre to sustain and build up the fabric of the strawberry plants and fruits, and it is best to supply them with artificial manures as plant food, which is at once available and necessary during their short season. Even more on account of the great drain on the plants in the production of runners than for the fruit high manuring is essential to successful strawberry cultivation. Mr. Willis states that from numerous investigations horticulturists use nearly 7lbs. of nitrogen in the form of manure to get back 1lb. of nitrogen in the crop produced. You will therefore require large quantities of farmyard dung, which usually contains in a ton, according to him, 11lb. of nitrogen, or, as Professor Lawrie judges of our South Australian farmyard dung, between 8lbs. and 16lbs. It may also contain from 8lbs. to 17lbs. of potash, from 4lbs. to 9lbs. of phosphoric acid, and from 10lbs. to 39lbs. of lime. Now let us compare other manures with farmyard dung. As good, unadulterated Peruvian guano, not leached out by rain, should contain in a ton 357lbs. of nitrogen, 213lbs. of phosphoric acid, 182lbs. of potash, and 198lbs. of lime, or which the nitrogen easily becomes soluble, it is equal to 22 tons of farmyard dung. Guanos from near our coast are probably of much different value, and guarantees as to the composition are therefore very necessary. As with most Englishmen, bonemeal and steamed boneflour come in for praise by Mr. Willis as a phosphatic manure, which quality has been lately, to a great extent, denied them by many German scientists, except when opened up by phosphoric acid like mineral phosphates, and used as superphosphate or, better still, double superphosphate. Doubtless these phosphatic manures are very valuable for the purpose of ensuring a rapid and vigorous early growth of plants. We may even concede to them in this respect an advantage over the same quantity of Thomas phosphate. The latter, although acting slower, makes its presence felt for four or more years according to many experiments. Mr. Willis admits Thomas phosphate as a valuable and suitable material for providing the soil with a lasting supply of phosphoric acid, which will ensure the healthy development of fruit trees, ornamental trees shrubs, vines, and encourages a finer quality of grasses on lawns. Of potash salts Mr. Willis recommends the use of kainit for potatoes, as improving weight and quality, muriate of potash tending to make them waxy rather than mealy. Sulphate of potash he favors for peas, beans, vines, fruit trees, and roses if combined with some phosphatic manure. Phosphate of potash, like the dear phosphate of ammonia, is well adapted in general for horticultural purposes, the former combining potash and phosphoric acid, the latter phosphoric acid and ammonia (and therefore not of use for leguminosæ). Of nitrogenous manures sulphate of ammonia, which contains 448lbs. of nitrogen to the ton, cannot be useful in chalky or limestone lands, as lime expels the ammonia in the shape of gas; but in strong and clayey soils it is more lasting, if slower, than nitrate of soda, which is exceedingly active, both feeding and stimulating, as a top dressing. Thus 100lbs. of nitrate of soda will furnish at once more nitrogen to plants early in the spring than can be got from 8 tons to 10 tons of farmyard dung, which gives only nitric acid for late crops. Dr. Arken says the nitrate causes the crop to blaird vigorously, that it is often the saving of it where it seemed precarious in youth, especially in seasons of drought, as it enables the young plant to root rapidly and become less dependent on surface moisture. Actually—that is, by a slow and halting process— $1\frac{1}{2}$  tons of ordinary manure may supply as much nitric acid as 10wt. of nitrate of soda; but with the application of the latter you can alone control its action when you want it, for its characteristic is the rapidity and freedom with which it permeates the soil, and foliage, flower, fruit, or wood may be advanced and developed at will by its judicious and timely use. Apply about a handful, or 4ozs., to 8 sq. yds. of ground, mixed for facility of distribution with fine dry earth, as soon as the young plant has exhausted the supply of food derived from the seed, and renew the dressing at intervals of a few weeks. If used in solution  $\frac{1}{2}$ oz. in 1gall. of water is strong enough; but it should not come in contact with the foliage. Dr. B. Dyer, the consulting chemist and agricultural analyst of nine counties, calculates that there was room in England, without interfering with the consumption of other manures, for the annual use of 300,000 tons to 400,000 tons of nitrate of soda, or from three to four times that now used. Mr. P. Dickson had on a field of rather poor loam used twenty loads per acre of farmyard manure without artificial manure and harvested



15½ tons of swedes, while where he had used in addition ½ cwt. of nitrate he had 26½ tons of swedes; 4 cwts. of nitrate and 4 cwts. of superphosphate gave 6 tons and 28 lbs. of cabbages per acre, and for hops 2 cwts. or 3 cwts. of nitrate should be applied, especially in dry seasons, when you may expect with a good price almost fabulous profits. And Sir John B. Lawes well remarks—"When we consider that a few pounds of nitrogen in nitrate of soda to a soil which contains several thousand pounds of nitrogen in its organic form is capable of increasing the crop from 14 bush. to 40 bush., or even 50 bush. of wheat per acre, I think it must be apparent to all that we have very convincing evidence of nitric acid being the main source of the nitrogen in plants." Professor Freese-Thonger says—"Nitrate serves directly as food for plants; it has not to undergo any change in the soil," and "plants can better resist disease, insect, and parasitic attacks." In not using the above artificial manures market gardeners especially are not alive to their own interest. Mr. Willis gives some experiments on potatoes carried on for twelve years at Rothamsted, which show that without manure on an average barely 2 tons per acre were dug, and, what is more remarkable, that there is much less increase of tubers by using nitrogenous than mineral manures alone. Four hundred pounds of ammonium salts alone gave only 6 cwts. more, 550 lbs. of nitrate of soda only 12½ cwt. more; 14 tons of farmyard dung increased the crop to 43 cwt. more than without manure. But where mineral manures were applied with the ammonium salts you had a plus of 94½ cwt., and with the nitrate of soda of 93½ cwt. The 86 lbs. of nitrogen in the artificial manures used produced a much better crop than the 200 lbs. not quickly available which the farmyard dung did contain. At four years' trials in Connecticut, U.S.A., heavy soils gave generally, except where muriate of potash alone was used, better results than light soils when treated with commercial manures, and, where superphosphate, potash, and nitrate of soda was used the gain per acre over unmanured land was for light soil 73-2 bush. and for heavy land 95-4 bush. The incapacity of a potato crop to avail itself of the nitrogen supplied in manure in the absence of a sufficient available supply of mineral constituents is very strikingly illustrated when 200 lbs. of nitrate of soda alone increased the crop only by 13-3 bush. in light soil and by 0-6 bush. in the heavy soil. Experiments with tomatoes showed also that to supply all three manures, viz., superphosphate, potash, and nitrate of soda, gave the best crop; but 160 lbs. of nitrate of soda were almost as effectual as 20 tons of farmyard dung, showing again that the latter is not available enough for short living plants. Experiments with peach trees in New Jersey during five years showed that nitrate of soda alone gave a darker color to the leaves, but the application of it did not pay. Superphosphate alone increased the size of the leaves, gave more fruit, but of small size. With muriate of potash alone the leaves were smaller but darker, and the fruit as good if not better in quality. A mixture of nitrate of soda and superphosphate showed large leaves of good color and more fruit. Nitrate of soda and potash made the lower branches die, and only those on the top remained healthy and fruitful. Superphosphate and muriate of potash gave good results, but where potash, superphosphate, and nitrate of soda were applied leaves and trees were healthy and the fruit of good quality, and during ten years by far the largest crops and profit were made from trees so treated. With 20 tons of farmyard dung the yield of fruit was in four of the years still better, but so excessive in 1890 that a few of the trees will die. Nitrogenous manures alone produced wood and luxuriant foliage; mineral manures supplying potash and phosphoric acid encourage fruit buds and maturation of fruit, and are most necessary for peach trees. The potash increases the size of the fruits; they are beautifully colored, and have a most excellent taste, but kainit should not be used. Experiments made with manuring cherry trees in Germany show very similar results—that muriate of potash, Thomas phosphate, and nitrate of soda or sulphate of ammonia produced the largest crop and the finest cherries. Experiments with apple trees so far have shown that 5 cwts. of bonemeal, with 20 lbs. of nitrate of soda and 150 lbs. of muriate of potash per acre, gave a large crop of excellent quality and color, but doubling these quantities gave very much better results. In Nova Scotia are trees of "Gravenstein" which bear up to twenty-five casks of apples where stable dung and mud are thus supplemented with artificial manures. Pears treated with Thomas phosphate and kainit gave very large crops. The results with apricots and plums are not yet published, although made, and as regards apples and pears the experiments have so far been made, only in not many different localities. Currants require chiefly nitrogen and phosphoric acid; gooseberries require also potash. With stable dung, double superphosphate and sulphate of potash gave the largest crop, but if some hornflour, sulphate of ammonia, and nitrate of soda were added the size of the berries was nearly twice as large as without the artificial manures. Mr. Ewers, of this province, made interesting experiments with raspberries, according to which the application of 746 lbs. of blood manure, 133 lbs. of double superphosphate, and 265 lbs. of muriate of potash gave him a crop of 2,957 lbs. per acre, against 1,792 lbs. unmanured. An increase of the above manures did show an increased crop, but not a corresponding profit; 568 lbs. of nitrate of soda, 144 lbs. of double superphosphate, and 143 lbs. of muriate of potash gave 2,598 lbs. per acre.

It remains for me to again call attention to the necessity of demanding a guarantee as to the constituents of the different artificial manures. In the discussion which followed the reading of Mr. Willis's paper Mr. A. D. Hall, the Principal of the South-Eastern Agricultural College,

said that in many instances the very constituent of which least was found in the plant's composition was the one upon which its growth mainly depended, and mentioned that swedes remove only 22lbs. of phosphoric acid per acre from the soil, against 98lbs. of nitrogen and 80lbs. of potash, and yet they are usually grown with superphosphate and other phosphatic manures alone. He also gave his analysis of twelve mixed manures, which showed clearly to what extent farmers and gardeners are cheated with such mixtures. Amongst them was not one where his valuation came near to the price demanded. A manure worth £3 7s. was offered at £18 a ton, one worth £4 16s. at £32, one worth £3 8s. at £20 per ton. One contained only insoluble phosphoric acid and under 1½ per cent. of nitrogen. At all events, it is in all cases safest to purchase your several manures and apply them singly, or in most instances in such combinations as your experience or experiments have shown advisable. The startling disclosure made concerning "Rawson's patent fertilisers," proved only to be worth 17s. 6d. per ton, but sold at \$5 in Victoria, is another instance how farmers may be victimised.

Some discussion ensued on the sale of commercial fertilisers according to analysis.

The GENERAL SECRETARY pointed out that the Fertilisers Act and regulations provided that all manufactured fertilisers must be sold with a guaranteed analysis; but the processes to be followed to prevent fraud on the part of the dealers came in for much adverse comment.

The following resolutions dealing with the subject were carried:—"In the opinion of this Conference the provisions of the Fertilisers Act should be amended so as to apply to colonial guano"; and—"That the Government should appoint an inspector whose duty it should be to prosecute dealers who infringe the law, and to otherwise protect the public against fraud."

### Rural Industries.

MR. R. CALDWELL, M.P., read a paper on "The Present Condition and Possibilities of the Rural Industries," of which the following is an abstract:—

So far as observation has extended statistics seem to show that the annual rainfall of the settled portions of the province has decreased to the extent of about an inch in thirty years. As the record only covers two such periods we are not in a position to speak with authority, but the statement furnishes food for reflection, particularly if the decrease is likely to prove continuous, as the whole of the rural industries are bound to be detrimentally affected. According to my judgment such a condition need not be feared; for allowing that the larger specimens of vegetation, trees, shrubs, and tussock grass have been greatly interfered with, the time is not far distant when a normal condition will be reached. There is no denying the fact that a great destruction, and in some instances annihilation, has taken place. The sheoak has either disappeared or is disappearing from the more open country; the heart has been taken out of the kangaroo grass; the strong perennial spear grass has been nearly exterminated, while the very black spinifex grass, porcupine, and wiry tussocks have either been ploughed under or burnt off. On the pastoral country a similar process has been operating. So far as the surface covering of the country is concerned there has been a great deterioration during the last sixty years, and it is just possible that the very soil has suffered through the injury that the surface-covering has sustained. The trees, shrubs, and tussock grass that had sheltered the ground from the withering ray and the wasting wind and the roots and fibres that keep it from being cut up by storm-waters have been removed; and in most instances the country is on the drift. Here and there action is being taken to arrest the deterioration, and often with gratifying results; but the drift-currents are so wide and strong that what has been done can only be said to serve the purpose of small object lessons, but object lessons of the most vital importance. Whether the removal of the surface-covering referred to has occasioned the decrease in the rainfall need not be argued at present, although many reasons might be recorded in favor of the contention that it has. Appearance warrants the belief that the vegetative properties of the soil of our division of the great island have always been weak. At the same time it would have been strange if the surface, after having been exposed for hundreds of years to the action of all the forces of nature, had not proved equal to the maturing of many harvests of the finest of grain and other products. The fact is forced upon us that our territory now requires more than the tickling of a hoe to make it laugh into a harvest. When the soil was in good heart and there was a fair market farmers and gardeners were able to hold their own even after having paid high premiums for their land; but when fertility went out of the old pasture and farm and garden, people began wandering in all directions in search of "fresh fields and pastures new." For a time the larger and fresher holding yielded satisfactory returns, but whether for pasturage, horticulture, or agriculture the area had to be increased, owing to the declining fertility of the land.

The uncertainty of our rainfall is of course one of the greatest drawbacks, but the evils resulting might be lessened by replacing the surface-covering that has been removed, and making use of such manures and methods of cultivation as experience has shown to be most advantageous. It will take many years (perhaps centuries) to replace some of the forests and scrubs that have vanished before the axe and the plough, but the sooner an attempt is made to arrest deteriorations the better. Some years ago an Anglo-Indian told me he hailed from a district where several hundred inches of rain fell during the year. I ventured the remark that all the surface soil must be washed away. His reply was that the surface was so densely covered with vegetation that the rain seldom struck the ground. The great trees and undergrowth protected the soil from being cut to pieces and carried away by the flood waters.

My attention was once directed to a patch of grass near a drafting yard on the edge of a wind-swept plain. My informant told me it had once been destitute of vegetation and nearly as smooth as glass, but the droppings of cattle and an occasional stick or stone being placed upon it had caused dust and soil to settle so that in a few years the whole surface was covered and grass came. A few stones on the surface are better than nothing at all. Thousands of square miles of the great dry North would have been blown away long ago if it had not been for the surface protection of broken stones. Timber, shrubs, tussock grass, and stone serve a good purpose in the economy of nature. If the surface is to be broken by cultivation shelter is necessary to provide for contingencies that are bound to arise. The deterioration of the North would not have been so rapid had it not been for the fact that nearly everything found growing there is edible. Shade and shelter trees and rushes are as necessary as any other kind. It is well that a beginning has been made with Marram grass along the coast. The sandhills and treeless plains and plateaux of the interior must not be forgotten. The sentiment should be "Plant and protect!"

Considerable discussion took place, many of those present taking part.

### **The Appointment of an Economic Entomologist.**

Mr. G. MONKS, Forest Range, read the following paper on this subject:—

Producers, and particularly the small producers, are a long-suffering, patient, contented, and, generally speaking, an uncomplaining class of people, they will suffer and be strong a long time before appealing to the Government for a remedy to their troubles. They are suffering to-day from several kinds of insect pests; amongst these are aphids, red scale, and last but not least the codlin moth. I am prepared at once to admit that it is a hard matter to say how to get rid of them, particularly the last named. On account of its peculiar characteristics it is a very difficult matter to find any parasite that is able to get at the codlin grub during the time it is in the fruit, and, so far as my experience goes, only one has yet been known to do this, and that one is the little black ant. I am pleased to note, however, that several insect friends go for them after leaving their feeding grounds, viz., spiders, centipedes, wasps, little lizards, ants, and others. In spite of spraying and other operations which are being brought to bear upon them, they seem to be on the increase rather than on the decrease, and I am afraid that such will continue to be the case until their natural enemies are found and brought in permanent contact with them in such a way as to result in their total eradication. The only way, in my opinion, to bring about this desirable result is by the creation of an Entomological Department, and by the appointment of an economic entomologist. It requires someone who can attend to the matter in a systematic way. The producers are not able to do this on account of want of time, and also the necessary knowledge.

Some of the systems in vogue at the present time are impracticable in some orchards—spraying, for instance, on some of the hillsides. The hopgrowers in the old country have faith in and know the practical value of entomology, for as soon as the hop-fly makes its appearance upon the hop vines they search around at once for the ladybirds, and these soon make short work of them. Our American cousins also have abundant faith in entomology, or they would not have sent an entomologist all the way to Australia for the purpose of procuring ladybirds, and we have every reason to believe that it was successful. At present, on account of our ignorance, we kill the insects we ought not to kill, and leave unkilld those that we ought to kill. Now, if an entomologist did no other good, he would at least put us right here; spiders, wasps, and other useful and friendly insects are very often destroyed for want of knowing better.

I am well aware that it is contended in some quarters that the insect friends come upon the scene frequently too late to do the good they ought to do, but I think this difficulty could and would be overcome if an Entomological Department were created, because then sufficient insects for all practical purposes could be propagated, preserved, and imported when and where possible. There is also a good deal of opposition to such appointment on account of the expense attached to it; but I do not think that this should be made a stumbling-block or a barrier if it can be shown that it is a benefit to the community, for, if necessary, it might be possible in course of time to make such a department self-supporting, or nearly so, by making a small charge for the supply of different parasitic insects; and I believe this mode of operation would

be cheaper and more effective in many cases, if not in all, than spraying and other means which are now in use.

Whilst I have great faith in insect friends, I also must not overlook our bird friends, which could be fostered by the department, for undoubtedly they must be favorably considered. It goes without saying that our native birds have been and are, most of them, amongst the best friends the producer ever had. In these days when science is making such rapid strides it behoves us to be up and doing, and fully alive to our interests, and to be prepared for any and all emergencies.

The agriculturist, the viticulturist, the poultry breeder, and the dairy farmer have their specialists employed by the Government, and who shall say that the producer and the community generally is not all the better for the knowledge disseminated by these gentlemen. That being the case, why can we not go still a step further and say that the community in general, and the producer in particular, will be all the better if an economic entomologist were appointed.

I move that, in the opinion of this Conference, an economic entomologist should be appointed by the Government without delay.

The GENERAL SECRETARY strongly opposed the motion. The appointment of an entomologist was unnecessary. The Central Bureau was quite able to do all that was likely to be necessary for an entomologist to do, and with probably better results.

Mr. QUINN agreed that the proposed appointment was not necessary.

After some discussion, several being of opinion that better results could naturally be expected from a specialist than from any of the Bureau officers, the resolution was negatived by a large majority.

### The Pea: Its Uses and Cultivation.

Mr. W. PEARSON read the following paper:—

I propose to deal with the subject under three heads, viz.—How to cultivate, its uses for feeding purposes, and its use as a fertiliser.

*The Cultivation of the Pea.*—It is necessary to reduce the soil to a fine tilth, to have it fairly firm, and to check the growth of weeds as much as possible, as the pea is not able to compete successfully with wild oats and other weeds which infest most of our old land. To obtain this end I advocate ploughing about 6in. deep about April, if the ground is in fit condition, or as soon after as possible; then harrow and roll as soon as it is in a fit state. This will be directly after the first rain, if it has been ploughed dry; but if the land was fairly soaked before ploughing, it would be better worked down at once. This will cause all seeds in the land to germinate; then sheep could be run on it until time to sow the peas, which will depend upon the climate and district. The last few seasons have had the effect of altering my opinion as to the best time to sow them; previously, I was very successful with crops sown late in August, and even the first week in September. Peas sown then grow rapidly, consequently kept ahead of the weeds, and if favored with showers in October and November, and the soil is rich enough, a good crop is assured, so far at least as the growth is concerned. But, unfortunately, even then the caterpillars often put in their claim, and it is but little use disputing it. The dry seasons we have experienced lately have been fatal to the late-sown crops, as there has not been sufficient moisture in the soil to enable them to blossom. This is the most critical stage with peas, even in a good season. I have seen a beautiful crop of peas in bloom so badly cut with hot winds in one day that you could rub the top blooms up in your hand; but, after the bloom has set, it is really surprising the heat they will stand. But with such seasons as we have had lately, I would recommend June or July, according to locality. My mode of putting them in is to sow the peas and bone dust on the land treated as above, and plough them under from 4in. to 6in. deep, and cross-harrow thoroughly. There are several advantages in ploughing in: First, all the seed is covered, so that the birds are cheated out of their share; second, the plants are deeper rooted, consequently stand drought much better; third, there is no seed wasted in the furrows. This I consider a very great advantage in wet land where it is necessary to have narrow lands for drainage purposes. The quantity of seed that jumps into the furrows is very considerable, and, of course, is all lost; whereas, when ploughed in, all that waste is prevented; fourth, there is not the trouble of scraping out the miserable half-grown things from the furrows when mowing. Do not roll until they are well through the ground. A good harrowing, if the conditions are favorable, will be beneficial—this should be across the previous harrowing, lengthwise of the land. The peas should be mowed when the top pods are just full, not dry, and put in small heaps in rows not more than a forkful in each heap, and preferably the rows should be up the furrows, and as soon as possible after being mown, as they then settle down firmly, and are not so likely to blow away with the wind, which often causes serious loss. The sooner they are carted, the less risk from this source. The most expeditious way is to cart in with one team

and roll out with another. This saves the labor involved in stacking and getting out on the floor. A rather dull day is preferable to a hot one for rolling out, as in hot weather the haulm breaks up so short as to render it almost impossible to separate it from the chaff and peas. A nice warm day with a cool breeze is the ideal day.

*Use for Feeding Purposes.*—For feeding hogs, especially in winter, I believe peas are without a rival; for summer, a little milk or pollard, or both, once a day will be found an improvement. They are also good feed for horses, either crushed or soaked. Personally, I prefer them soaked, as they are not so heating. If fed to horses dry they cause blind boils and dry ulcerous sores to break out on them wherever the harness rubs. Soaking prevents this. They are also excellent feed for fowls, especially in the winter; but they should be soaked for young fowls, or, better still, crushed and scalded. If the peas are cut and harvested as directed above, the straw will be found very valuable for young cattle, dry cows, and even milking cows, as an alternative with mangolds, or any soft green feed, such as young barley, oats, rye. I found my cows did well last winter fed on mangolds and pea straw, the latter at night.

*The Pea as a Fertiliser.*—For this purpose in the hills districts it is simply invaluable, as they have the capacity of collecting nitrogen from the atmosphere, when it forms in nodules about the roots, and remains in the soil in an available condition for the following crop of grain. My experience, extending over twenty years or more, teaches me that peas are more reliable for a hay or grain crop than bone dust or any other artificial manure that I have tried. It also has the effect of keeping the soil loose and friable, and if sown thickly, say from 2bushs. to 3bushs. per acre, it will help to clean the land very considerably, as it will smother all undergrowth. I have obtained better results from bonedust with peas than with any other fertilisers. The haulms used for stable or pig litter make splendid manure for stiff clay land.

Considerable discussion ensued, many members being opposed to Mr. Pearson's methods of cultivation, especially in regard to sowing seed so deep and to the manures used. Mr. Pearson, in reply, said the opinions were based on actual experience gained by extensive cultivation of the pea.

### Home Industries at Country Shows.

The GENERAL SECRETARY referred to the apportionment of prize money at country shows. He had noted at certain shows that as much money was offered for a dozen of eggs as for a collection of jams, jellies, pickles, sauces, and the like; but the skill, labor, and time involved in the preparation of the latter collection of home manufactures could not be adequately rewarded with a prize which was much more than an equivalent for the trouble of gathering and cleaning a dozen of eggs.

### Tobacco.

Mr. W. W. HEATH, Finnis, read the following paper on this subject:—

*Seed-bed.*—In raising plants from seed you must be careful to prepare a place that is as free as possible from all weeds. The soil in which the seeds are to be sown should be extra fine, and if it is first passed through a sieve, being mixed with about one-fourth fine unleached ashes, it will be so much better, using also a portion of fine damp mould. If you purpose growing under glass (and it is almost useless to attempt it without), prepare a bed as follows:—Put down about 4in. of old straw of any kind, making it thoroughly wet. Then upon this about 8in. of fresh horse-dung, and again put on about 4in. of good prepared soil. Now place your frame say 10ft. x 6ft., which will just hold three eashes, each 3ft. 4in. x 6ft. This will supply enough plants for one acre if the seeds come well. Now, as highly as possible, mark out your drills about 2½in. to 3in. apart, and sow your seed on these marks. Have a board 6ft. long and 7in. wide. Commence at one end of the bed, putting this board down so as to cover two rows, and walk over it to press the ground about the seed. Move the board over the next two rows, and repeat until the bed is pressed over. Now, with a fine rose, thoroughly wet the bed with weak manure water. Put on your sash, slightly shading it with straw. If the sun comes out bright and warm, raise the sash a little at the back to let out the heated air. Keep your soil damp, but not too wet, and if light rain comes remove your sash for an hour or two; but never do so with a hard or beating rain. A gentle heat is all that is required. After the plants are up well a light watering from a fine rose of 1oz. of sulphate of ammonia to 4galls. of water will be beneficial. The seed should be sown from July 1 to August 1. This applies particularly to the Black Swamp. If the first sowing does not come well a fresh lot of seed may be first sprouted by mixing with fine mould, keeping it moist, and place near the fire or under the sash until you can see that it is just sprouting; then sow between drills. If the plants should come up too thick they may with care be transplanted when of sufficient size. Prepare a second bed, using only half the bottom heat, and cover with calico instead of glass.

Get thin slats 3in. wide, and nail two together. Put enough of these to fill up the bed, filling up spaces with good soil prepared from fine peaty loam and one-fourth sand, mixed, and carefully putting plants about 2in to 3in. apart. These will be most handy when planting permanently in the field.

*Preparation of Land for Planting.*—Now, as to the character of the soil in the field and its preparation. A dry warm soil, either loamy or sandy loam, or, even better still, a nice peaty loam not too wet nor too dry, just such as abounds with the Black Swamp lands, with plenty of pure sweet water in abundance, which cannot be beaten anywhere—nor likely to be equalled in this or any other colony. A cold wet and clayey soil is no good for tobacco, and even a loam with poor water is not the thing. A little lime may be beneficial, but the least quantity of salt is highly detrimental. In cultivation, commence now to plough and harrow, keeping it up till planting time, as the finer the tilth and the less the weeds the better the crop. Deep and thorough working will always pay, and the more manure the greater and better the crop. Old land that is in good heart with artificial manure is good, but new land or virgin soil with the same quantity of manure is far better, only get your ground clean and you are all right.

*Planting.*—As soon as the plants have four or more leaves, and are from 4in. to 6in. high, with a fair size stem, they are ready for planting out. Lay out your land in furrows at least 3ft. to 3½ft. apart, planting in the bottom of the furrow 2½ft. apart, or drag a chain same width as furrows, and dig holes at least 2½ft. apart. Thoroughly wet your seed-bed, take a stick about an inch wide, sharpen to a flat point, run this down near the side of the plant, gather the leaves gently together, and carefully lift out the plant so that the roots will not be hurt, only taking out as many as can be planted in a short time. If the weather is unfavorable and ground is dry then the plants must be watered as fast as set out and covered immediately after. Shading is best done with straw, as this will not interfere with after watering, and plants must not suffer for want of moisture until they are rooted.

Watch carefully that grubs do not interfere with young plants. Keep soil well loosened by constant working with a good Planet Jr. horse-hoe. Priming comes next in order, as bottom leaves often lie flat on the ground and get dusty or rot, and must therefore be removed, and the sooner the better. Do not tear them off downwards, as that will injure plants, but cut them off within ½in. of the plant and not more than 5in. or 6in. above the ground. Topping is the next operation, and should be done before seed-buds show themselves; otherwise the plant will be exhausting itself in growing seeds while you want leaves. Top so as to leave ten to fourteen leaves according to strength of plant and probable time it will have for growth. By starting your plants early, and topping with judgment, a crop may be increased one-half, which is no small item. Leave as many of the earliest and best plants as may be required for seed without topping, say one plant to an acre, but they must be wormed and suckered like the rest. Suckering is one of the most tiresome operations of tobacco-growing, and must on no account be neglected. Suckers will commence to show themselves in about a week from topping and continue up to ripening, and must be continuously removed, but must not be pinched off while the dew is on the plant. While suckering look out for worms. Worming and suckering will occupy all spare time for working the crop till harvesting, for the surface must be kept loose and in good order by an occasional hoeing, but do not hoe, prime, top, or sucker during rain or while dew is on the plants, or your crop will get rust and destroy the leaves.

*Harvesting.*—Now comes the great secret, that is, when the tobacco is ripe, when to cut it, and how to cure it, for on these operations depends the quality of the leaf for market and the price you will obtain for it. To a new chum at tobacco-growing this will seem quite a difficult matter, and so it is, but to the practised eye these difficulties all vanish. Tobacco, while ripening, is known principally by its color, but it is not an easy matter to describe with accuracy any particular shade of color, though there are other signs following which have a general reference to the appearance of the plant. When it begins to ripen it will gradually take on a light yellow spotted appearance: as ripening increases the spots become more separate and distinct from each other, and when they can be plainly seen at a short distance, and the leaves turn down, and when bent become sticky, breaking off short and their ends curl under, the plant is ripe and requires to be cut at once, as it will not improve after this, but it should not be cut before it is matured, nor yet while the dew is on the plant. To cut, you require a good strong knife (a cane knife or light cleaver), commence at top of plant and cut downwards, dividing the stem in equal portions down within 4in. or 5in. of the ground, take out your knife and cut off the stalk near the ground. Lay the plant carefully on the ground with lower end next the sun to wilt. After it has lain an hour or so turn it and expose the other side, but be very careful that the sun is not hot enough to burn it, which it will sometimes do in a short time. Wilting is done to prevent breaking of leaves in handling. As soon as the tobacco is wilted cart it to the shed, handling carefully, and hang it at once.

*Curing.*—To properly cure tobacco it must have sun or artificial heat to get a bright color, which is necessary. If you have a tight shed leave it open in good weather, but close it on the windy side when wind is high. If you have an open shed, which is best, you must have

some way of closing it against wind and rain. In cold drizzling or damp weather fire heat is essential, and nothing is better than hot air or hot-water pipes through the whole shed, so as to keep the temperature as even as possible. You can cure much sooner and better by fire than by air alone.

### **The Constitution of a Farmer.**

Mr. F. LEHMANN, Hartley, read a short paper on this subject, in which he pointed out the necessity for energy, perseverance, and care on the part of the farmer. To be successful a farmer must also be intelligent and observant; he should be a handy man, capable of doing little jobs in building, smithing, &c. System and order should be the rule of the farmer, as most of the principal work on the farm can be finished in season. He must be of a saving disposition, and should keep an intelligent account of his income and expenditure.

### **Standard Weight of Chaff.**

The resolution from Woodside Branch—"That steps be taken to have a standard weight of 40lbs. for a bag of chaff, and that immediate action be taken to obtain the co-operation of others interested to secure the legal enforcement of the same"—caused considerable discussion. Those in favor of the motion pointed out the necessity for some action being taken to prevent the unfair trading on the part of those who put light weight in the bags; 40lbs. was the recognised weight to the bag, but there was nothing to prevent less being put in, as it was sold by the bag which was practically an unknown quantity.

Several members, however, pointed out the difficulties in the matter of regulating the weight, and it was decided to refer the suggestion to the Branches throughout the colony for consideration.

Votes of thanks to those who had taken part in the Conference closed the proceedings.

## **AGRICULTURAL BUREAU CONFERENCE AT KAPUNDA.**

A Conference of the Lower North Branches of the Agricultural Bureau was held at Kapunda on Wednesday, April 6, when, in addition to a number of visitors, the following members of the Bureau attended:—CENTRAL—Messrs. Thos. Hardy and C. J. Valentine (Chief Inspector of Stock). KAPUNDA—Messrs. G. Teagle (Chairman), T. Jeffs (Hon. Sec.), H. King, W. Flavel, J. P. Orchard, J. A. Schultz, F. Meincke, H. T. Morris, H. A. Hothouse, and J. J. O'Sullivan. EUDUNDA—Messrs. J. von Bertouch and F. W. Paech. ROBERTSTOWN—Mr. N. Westphalen. RIVERTON—Mr. T. Gravestock. ANGASTON—Mr. S. O. Smith.

Mr. G. TEAGLE, Chairman of the Kapunda Branch, occupied the chair, and, in declaring the Conference opened, stated that owing to the rains of the previous week setting the farmers to work seeding, and to other circumstances, a number of those who had promised to attend were unable to do so.

It was decided to make this an annual gathering, the next meeting to be at Eudunda, in March, 1899.

### **The State of the Harness and Care of the Team.**

Mr. JEFFS read a paper on this subject, prepared by Mr. C. W. Smith, of Stockport Branch, of which the following is the substance:—

In a very short time the farmers of this colony will be getting their horses into work; there will be at least six months' hard work straight away. This being the case, we should give

attention to the state and condition of the harness, especially the collars. A good deal of the weight of the horse with the power of bone and sinew is thrown into the collar. As the collar bears only on a small portion of the horse's body, there must then be a considerable pressure on the horse's shoulders; therefore the collar should fit the horse as nearly as possible. If you notice a collar that has been used you will see that it is indented where the hook comes, showing extra pressure there. I think that if a piece of flat hardwood, with the edges nicely rounded off, were inserted under the leather when the collar is made, it would improve the collar by spreading the weight over a greater area, and thus save sore shoulders. A soft collar must be much more comfortable than a hard one for horses to work in. The collar may be made fairly soft by placing your leg through it so that it is brought on top of your knee when you are in a sitting position, then gently tap the outside of the collar. This should be done while the collars are dry, and a good deal of dust will come out. It will then take in the sweat more readily and be more comfortable for the horses. Another point is to have the hame hooks well up on the collars; the horses can step forward much easier when the hames are so placed than when the hooks are low down near the point of the shoulder. I advocate the use of backbands at all times. They may not be of much service when the horse is pulling, but when the team is standing the backband should take the weight of the swings, thereby easing the horses' shoulders, there being considerable weight in the swings of a five or six horse team. Again, the team should be allowed ample time in turning the ends of the fields; if hurried round, the probability is one horse will tread upon another's foot and cause a permanent lameness. The little time lost in turning may be easily gained when the team is in straight work. The farmer should well consider the constitution of his horses. This varies very much; one will have a good appetite and eat up all his dinner, and be ready for his afternoon's work in a reasonable time; while the horse with a poor appetite will take more time and pick out the best parts. This is no fault of the horse, but may be remedied by giving him some appetising medicine. I prefer giving such a horse less in quantity but better in quality—say a little more bran and pollard. This will enable the weaker horse to keep up to his work. Old horses must have more attention than younger ones in the matter of food. It is unreasonable to expect old horses to do the same amount of work as younger ones on the same kind of food. In a team of five or six horses there will be one or more slower at their work than others. The driver should carefully consider where the fault lies, if there is a fault, and not punish what appears to be a slow horse. In no case should the reins be used as a whip. If the middle horse requires waking up, and it is done with the rein, the outside horse is irritated by having his mouth jerked in such a way as to cause him unnecessary pain. It would be much better to carry a light whip and use that when required. A sharp clip with the whip would be more effectual than so much banging with the reins. I think it wise to take the team easy for a couple of days. If inclined to go, check or spell them at the ends, as some of them have been out of collar for some time, and, therefore, soft, and if allowed to tear away they may become over-heated and gall their shoulders, and be a trouble for some time.

Mr. KING had his collars lined with basil. He found they lasted longer, and he had never had a horse with a sore shoulder since using it. He did not approve of the whip for teams at work. Some horses would not get over a cut from a whip for half a day. He put the slowest horse on the outside, where he could be hit with the reins.

Mr. WESTPHALEN had some experience in lining collars with basil, and horses never had sore shoulders when it was used. As a maker of collars he advised the use of the collar for a time or two, and then have the stuffing adjusted to suit the peculiarities of the formation of the horse's shoulder.

Mr. GRAVESTOCK had worked a horse for seven years in a basil-lined collar and never had a sore shoulder. He did not at all approve of the use of the piece of wood suggested, as it would cause a gall where there was so much sweat and chafing. He thought it would be better to use a pad of leather or bag.

The CHAIRMAN had been amongst horses for the best part of his life. He thought the fault was with the lining of the collars. He found it was a great mistake to use one collar for two horses, as the shoulders were not of the same formation. If the padding of the collar were soaked in water overnight, when the collar was put on the horse the padding soon conformed to the shape of his shoulders. To take out some of the padding would be better than placing a piece of wood under the hook.



### Binder v. Stripper.

Mr. N. WESTPHALEN read the following paper on this subject :—

It is not my intention to quote authorities in favor of either system, but simply to relate my own experience. I bought eighty acres of good clean standing crop on the flats (what we call lagoon), of which I cut sixty acres with the binder, leaving twenty acres for the stripper. I finished cutting the sixty-acre piece before the other was quite ready for stripping, and just getting it out of the way of harm before the rough weather set in about the beginning of the harvest. That, of course, I consider one of the strongest points in favor of using the binder. The crop all through looked very green when I commenced cutting, yet I was surprised to find that it ripened in the straw all right, and turned out a first-class sample. I had two varieties of wheat—Steinwedel, all cut with the binder, also about ten acres of Purple Straw, the remainder being Purple Straw stripped in the usual way. In the appearance of the crop there was no difference in the yield of the two sorts of wheat. It was left in the stooks till the grain was properly hardened and then carted in to a stack, which caused a little loss in shaking out. I used Bagshaw's patent disc threshing header, worked by steam power, which leaves some amount of wheat at the butt end of the sheaf, as might be expected; but with sheaves tied closer to the butt end that amount would be reduced. The wheat left unthreshed is not lost, inasmuch as I chaffed all the straw and sold the chaff at £2 5s. 6d. per ton. The chaff is certainly superior to a great deal of chaff that is cut from a crop of wild oats, and may be used without any extra cost for bran and pollard, and constitutes good hard feed fit for horses doing heavy work. The actual results per acre, as near as I can state, are as follows:—

<i>Binding—</i>		£	s.	d.	£	s.	d.
By 1½ tons of straw, at 30s. per ton	.....	2	5	0			
12½bush of wheat, sold at 3s. per bushel	.....	1	17	6			
					4	2	6
Cost of binding and stooking per acre	.....	0	9	0			
Carting, threshing, cleaning, and stacking per acre	.....	0	12	0			
					1	1	0
Net amount realised per acre					3	1	6

<i>Stripping—</i>		£	s.	d.
By 15bush. wheat sold at 3s. per bushel	.....	2	5	0
Cost of stripping and cleaning	.....	0	5	0
Net amount realised per acre	.....	2	0	0

This shows a surplus of £1 1s. 6d. per acre in favor of the binder, and from my experience gained I conclude that it will pay every farmer to harvest as much as one binder can manage in the season.

In reply to questions concerning the value of the straw left by the stripper, the low price of wheat, and the loss of 2½bush. per acre through use of the binder, Mr. WESTPHALEN stated that his figures were from actual results. The year in question he only got 3s. per bushel for wheat; the straw left after the stripper was practically useless, and the apparent loss of grain was due to the sheaves not being tied close enough to the butt. As most of the grain was, however, in the straw it was not all loss.

Mr. KING said it was his experience that horses would do better upon ordinary hay than upon binder straw. The binder straw was not so good as hay, because when the wheat ear was allowed to mature, it took all the sugar out of the plant.

Mr. GRAVESTOCK said two years ago he brought the question forward at Tanunda, when he asked Professor Lowrie if there was as much nutriment in the plant after standing two or three months as there would be if it were in the stack, and he said no. He (Mr. Gravestock) thought it was robbery to sell such stuff chaffed up as hay chaff. Horses would not eat the chaff made from binder straw. They could not expect to get good wheat and hay from the same plant. After deducting the reduction in price of the wheat from the binder and the loss that take place in stacking, he failed to see where the profit came in.

Mr. PAECH agreed with Mr. Westphalen. He believed the wheat from the binder was better than from the stripper, and millers had told him that it was

better. The land could be kept clean with a binder, but not with a reaper. The hay from the binder was always useful for feed for stock.

The CHAIRMAN said the land could be kept clean by a few sheep. He found his land equally clean after the stripper and sheep as after the binder. They lost nothing with the sheep as they could be turned into mutton

### Judging at Country Shows.

Mr. E. S. Matthews, of Angaston, was to have read a paper on this subject, but, in his absence, Mr. SMITH stated that Mr. Matthews' contention was that the judging at country shows was very much mismanaged. Sometimes it was the secretary's fault, but very often the person who had promised to judge at the last moment sent a telegram stating that he could not attend. So that it sometimes happened that, for example, a judge of live stock was asked to judge flowers, or a judge of flowers to judge honey, pelargoniums, and queen bees, and so on. The judges were frequently incompetent. There was a case at the Angaston Show where a judge of flowers had given prizes to first, second, and third, the first entry getting first, the second second, and the third third, without regard to superiority. Similar incompetency was shown at times in other classes.

Considerable discussion followed, a number of members giving instances bearing out to a certain extent the contentions of Mr. Matthews.

The CHAIRMAN and SECRETARY of the local society said every care was exercised to get competent and unprejudiced judges; but it sometimes happens that the gentleman who has accepted the position is unable to get away, and in such case the officers of the society must do their best to get a local man to do the work. Things generally were not so bad as made out, and the societies did their best to obtain the services of men competent to give satisfaction to the exhibitors.

Some members thought the difficulty was due to the number of petty shows throughout the country. If there were fewer but larger shows there would not be the same trouble as at present in regard to judging.

### The Produce Trade.

Mr. T. JEFFS read a paper on the "Produce Trade: What it is and what it should be":—

It is essential that every farmer should pay some attention to the dairy, because it is a means of increasing the farm revenue at very little extra cost. In many cases the dairy and fowl yard have provided the necessities of life when the wheat crop has proved a failure, and if more attention were paid to dairying it would be a great success. I want, therefore, to allude to one or two phases of the produce trade—what it is and what it should be. Speaking of the local trade, we know some would say that the prices received did not encourage increased attention. The reason was that butter, for instance, was sold to the stores, then sent to Adelaide and sold as "storekeepers'" or "collectors'" butter, and the producer suffers. In the first place it always pays to make the best, and the storekeepers could encourage this if all produce was classified instead of calling it all butter. Then if the producer was making good butter, he could demand the top price, especially if he had any quantity, because if the local storekeepers would not give the market value he could send it to Adelaide, and it would be sold as "dairy" butter, and what was true of butter was true of all dairy produce. Cheese, bacon, and ham were profitable products, and would pay well if more attention were paid to them. In these days of co-operation and advancement, the ordinary dairy has to give place to the separator, and local wants are outshadowed by the attempt to supply the wants of the markets of the world, and this, of course, led up to the export trade; and although the Government had done a great deal to assist this trade, and to an extent producers had availed themselves of the opportunity afforded, still very little has been done. We should be a community of producers, and not manufacturers. It was absurd to expect to be able to compete with such manufacturing countries as Great Britain, Germany, and America; but we could hope to successfully enter into competition with the world as regards our products. The produce imports of Great Britain last year amounted to £24,000,000 of which £15,000,000 represented

butter, of which Denmark sent 886,551cwts., an increase on the previous year of 100,000cwts. Canada, we are told, did the most of trade in cheese, viz., 1,250,000cwts. Now what did we export? Butter, 1,400cwts.; frozen meat, 11,323 carcasses; poultry, 545 head. They would see by those figures that our exports after all are very little. But are we not right in saying we should have a large slice of that trade of £24,000,000? But this is not all. Think of the other great countries, most of which are importers of produce, and they would then see to what extent this trade could grow. If all South Australia were a huge dairy produce farm it could not supply the cities of Europe. I know there were difficulties in the way, but we should do everything possible to surmount these difficulties. First, we must send produce of best quality and it must be uniform. That, so far as local production is concerned, is a difficulty, but to get over this we must have co-operative dairies. This would be far better than having so many small separators. Then we must have an expert who is able to classify the butter, and tell us just what is wanted. Then the difficulty of fodder has been brought forward, but this is becoming easier every year as we are continually trying various summer fodder plants. The distance between us and the European markets is a great difficulty, but we must consider that in the matter of wheat and wool it has made very little difference. It may happen now and again that by taking four weeks to get our goods to the market we miss a good market, but we must not think too much of these difficulties. Look at the importance of an increased produce trade. I believe we have in the trade the means to remove the present depression. There was a lot of good land which is not used to its best advantage; and many farmers who do not give this trade proper attention. What is true of butter is true also of all the products. What a future there is before the frozen meat trade, cheese, poultry, eggs, bacon, honey, tallow, and even rabbits; and I feel confident it would pay the farmers to consider them.

Considerable discussion took place on the value of saltbush on the farm.

Mr. KING tabled plants of four different kinds grown on his farm. They had done very well, and he found the cows became very fond of the plant; in fact it was necessary to protect them for a year or two. They not only produced good food, but sheltered the young grass.

Mr. MORRIS said nothing fattened stock like "Old-man" saltbush, but he did not know anything about its milk-producing qualities.

Mr. PACEY said that during the past three years cattle in the eastern hundreds had scarcely anything but saltbush to feed on, and very often nothing but the thick stems, and still they lived.

Mr. VALENTINE said there was no reason why they should not grow an acre or two of saltbush; hundreds of acres of land at the Cape and in California were being planted with Australian saltbushes, while here we were destroying instead of conserving the bushes.

[Seeds of saltbush can be obtained from the Central Bureau by anyone forwarding postage.—GEN. SEC.]

Mr. JEFFS thought the appointment of Mr. G. S. Thomson as dairy expert a step in the right direction, as, having a thorough knowledge of English requirements, he could advise us how to make our butter to meet the home tastes.

Several members thought an expert with colonial experience was needed, and not a person fresh from England, and unacquainted with colonial conditions.

The CHAIRMAN pointed out that one of their greatest difficulties was the high temperature of their dairies, with which English makers had not to contend; and then, again, the difference in the feed in the two countries was very great.

Other members, however, pointed out that, as they must depend upon the English market for the extension of the dairying industry, it was most important that anyone appointed as adviser should be fully acquainted with the requirements of the English trade.

Mr. JEFFS said the matter of temperature was not such a great difficulty. In Mr. Wyllie's local dairy the temperature never exceeded 60° F., and others could get the same results by exercising the same care and attention that Mr. Wyllie did. Generally not sufficient attention was paid to cleanliness in and around the dairy.

Reference was also made to the cultivation of piemelons, mangolds, and other fodder plants, the making of ensilage, and the use of molasses and salt with straw as food for dairy cows.

### Feeding of Stock.

Mr. C. J. VALENTINE, Chief Inspector of Stock, gave an address on this subject, of which the following is the substance:—

The condition of the country is not as it was thirty or forty years ago, when it was open and there were plenty of pastures, and cattle were not confined to small areas, but had the pick of the best feed and left the inferior. The consequence was that they thrived well. Thirty or more years ago they had dry seasons, and a number of cattle died, but they never had complaints of sickness, and the cattle soon made headway when the grass appeared. Now the country is divided into small areas, and the land is required to carry more stock. The cultivation of the land has done away with the native grasses, and in them they lost some of the best feed for their cattle. It would well repay to preserve some of the native grasses in small paddocks on the farm, but it would be found somewhat difficult now, as the land has been cropped and cropped until all the nutriment was taken out of the ground. The land was now filled with wild oats, which was one of the worst kind of weeds in the country. The only time the wild oats were any good was when green, and then they sometimes kill a cow. Cows were not properly fed, and a great deal too much was expected from them. The best hay was given to the horse, and what he left was given to the cow. They drained her system by milking her and yet gave her the worst feed. They did not get the benefit from the cow that they would if she were properly fed. They could not do well by keeping twice as many cattle on their farm as they had feed for. They could not produce good beasts unless they fed the stock well when young. All unremunerative cattle should be got rid of, as they require as much feed and care as the profitable ones, without giving an adequate return. If one cow gave 500 galls. of milk, and another only 250 galls., why keep the cow that gave the lesser quantity? Get rid of her, but always feed the good cow well.

The same remarks could be made to apply to sheep. All farmers should keep a few sheep. They keep the land clean. But when they bought sheep they should not buy old ones. Sheep would always bring in something. But they should never overstock. They could always make more money out of a limited number of cattle or sheep which were well fed than out of twice the number half-starved. He was of the opinion that it would always pay the man who keeps cows to make ensilage. It was astonishing how well some people kept their cattle in spite of dry seasons. If a man had a small paddock or two he could grow lucern, sorghum, and other fodder for the summer, and could turn into ensilage stuff that was now wasted. His dry straw he could convert into useful feed by treating it with molasses and brine. He had seen cattle come off farms about Kapunda that he would not give a straw to. The rearing of stock was a matter in which a man should use his brains, and if he did so, he would make a success of it. He would impress upon them the necessity of keeping nothing but the best cattle or sheep, and that could be done by culling. In some places, perhaps, sheep only would do better than cows; whilst in others cows and sheep together would do better. That was a matter that should be carefully considered by the farmer. They should also pay attention to the proper cultivation of their land. The land should be manured. They could not expect the land to go on yielding crop after crop without proper treatment. It was difficult to say what caused the complaint affecting cattle, and causing loss of power in the hindquarters. In some cases at Port Lincoln, where it appeared to be paralysis, he thought the cattle had been eating something that had disagreed with their kidneys. He advised the use of something for inflammation of the kidneys, and he heard subsequently the cattle were better. The remedy was a tonic. The cause, he thought, was principally dry feed through a long drought. Sulphate of iron, bone-meal, and also warm ordinary ale were excellent things. A bone-crusher was a very useful thing on the farm, as bone-meal was often wanted by cows. On the Peninsula the cattle seemed to suffer on account of something deficient in the soil. He advised mixing bone-meal and salt (not rock salt) with the chaff, and also to have a trough containing some of the mixture for the cattle to lick at when they liked. He made a practice to give his horse two or three handfuls of salt a week. The cattle were very fond of salt.

### Colonial Experiences.

Mr. GRAVESTOCK gave an interesting address on his Forty Years' Experience in Farming in South Australia, in which he recounted his experiences with the different implements which had been invented, and the difficulties they had to contend with in the early days of the colony. A short discussion followed.

## Pruning and Grafting the Vine.

Mr. S. O. SMITH read a paper on this subject, of which the following is the substance :—

One of the first things a beginner should do on entering a vineyard in bearing is to look closely at the vine, and particularly the wood of last year's growth, and note whether the distances between the buds are long or short, for the short noded vines are, as a rule, good heavy bearers, and want shorter and even less wood than the longer noded and shy bearers. In pruning with long spurs particular care should be taken to prepare for next year's pruning by leaving, if possible, a short one-eyed spur just below, so that another good shoot, and perhaps two, will be there to take the place of that left this year. As to the number of spurs or rods to leave, the beginner will only learn by carefully watching the effect of the former pruning. For instance, a number of the buds may not have burst, or, if they have, they have withered off, and the wood generally looks sick. In such a case there has probably been too much wood left, inducing the vine to overbear, or perhaps the soil is poor. Less wood should be left and most of the arms cut back to a convenient spur of new wood. In the cutting back process, should there be too few spurs, then leave a long rod or two, and tie them round the outside of the vine. So much has been said of late years about forming the young vine that I need not dwell long on the subject. The first year cut back the young wood to one eye, unless exceedingly vigorous, leaving one or two spurs, as the case may be. Next year spur back again to two eyes, leaving two to four spurs, and so on. So much depends upon the way the young wood grows, and is affected by wind, locusts, frosts, &c., that it is really difficult to lay down on paper any hard and fast rule. I have pruned a young vineyard for several years in succession, and then would have been ashamed to own it if it had to be judged without the conditions under which I labored being known. It was simply "do the best thing I could." This was on account of the causes mentioned above. In a case of this sort it will take years of patient work to get the vines into proper shape, at the same time producing good crops, for the latter is the chief end of the vine and the aim of the pruner. Thus far for the gooseberry-hush style.

At Yalumba we have very successfully proved the benefits of trellising, both with one and three wires. Professor Perkins introduced a method of pruning and trellising some years ago called Sylvoz cordon, in which the vine was brought up in one straight shoot from the middle wire and sharply bent and carried along under the wire, being tied at the bend. All shoots from the ground up to 15in. beyond the bend were suppressed. In the second year canes or rods were taken, 15in. apart, and bent down sharply like the knuckle of a bent finger and tied to the bottom wire. This sharp check was, in the first place, by starving the rod to make it produce more fruit, and, in the second, to force out strong shoots at the base of the rod, thus providing a fresh shoot to take the place of the down-turned rod of the previous year. I believe I was the first to make use of this system to any extent, and after continuing it for three years on a fourteen-acre currant vineyard, discarded the rod principle and used the long and short spur, with the result of better crops and less expense. I do not condemn the principle of Sylvoz cordon, as it may suit other soils better than it did mine. One of the finest crops of Shiraz I have seen was produced this year on trellis, the main arm being left and all shoots pruned to two and four eyes. It is such a simple method that the beginner could learn it easily. Professor Perkins condemned the twisting of the rod around the wire, but he had found it successful, because it prevented the swinging of the rod about and cutting the cord through.

Grafting should be commenced when the vines are bursting the buds, and not before. The scions should have been kept in a sand bed, lying flat, so that they will be hungry for the first flow of sap. This ensures a good junction of scion with stock. Dig out a hole round the vine of about 3in. or 4in. in depth, find the straightest part of the stem, and saw off just at the upper part. This will give a good splitting surface. Take an old shear blade, or any other convenient tool that will stand a good knock, and split the centre of the stump, pull out the knife and insert a long wedge (an old 6in. bolt with a chisel end is suitable), opening out the split about ¼in. Then cut your scion to the shape of the split, so as to fill it from bottom to top, and slightly smaller on the inside. Fit in a scion on each side of the wedge, and carefully draw out the latter. Place a leaf or piece of paper over the split between the scions, and cover up carefully with earth, treading in in the meantime. Cover up to the top eye, or even over it. Pay particular attention to the choosing of good bearing wood for scions, as the value of your labor and time may be greatly dis-counted by putting on non-bearing scions. I have used clay when grafting above ground, but it is not necessary when grafting beneath the surface if the soil is well trodden down.

Mr. HARDY said Mr. Smith's paper was to the point, and no opinion that had been advanced could have anything said against it; perhaps a little more might have been said in favor of them. There was no necessity to use clay

when grafting. It was never used now by large grafters; sometimes nothing at all was put on. They should contrive to have one bud in the cleft in the stock, so that if the buds above it failed the bud in the stock would grow. He had seen the advantage of that this year more than ever he had before. The top buds died off, and the vines looked as if they would never grow; but the bottom buds shot up and the vines were now growing strongly, and he thought that 90 per cent. would live. The information given as to successful grafting would be a good thing for many people, as it would give them confidence to graft where considered necessary. They knew that too many of the commoner sorts of grapes had been planted, and in some cases it was desirable to graft the inferior with a better class of vine. This year he cut about a ton of grapes to the acre from Shiraz grafted on last year. The Mataro grape had been cried down, but he thought wrongly. If they had not had the Mataro they would have had a very small crop this year. On good land it would give a good and marketable wine, and he thought it would be a mistake if people grafted a very large portion of them. He thought the Sylvoz system was on its trial here, and he did not think they could yet say a great deal either for or against it. He had not adopted it to any great extent, because they worked on a system of their own which had been very successful. When they got hold of a successful method they were not inclined to adopt new methods. He liked to try everything, and hold fast to what was good. The system of long pruning—a modification of a French system—had been successful. He used four rods and two spurs on each side of the vine. He tried two rods and two spurs, and came to the conclusion that his own system was the better. Where vines grow strongly, and there is plenty of wood, it answered very well. The principal fault of the Sylvoz system was that the shoots were very liable to be broken when bending them sharply; it was a difficult thing to do without breaking them, and the system required three wires, which was also against it. He had found that in most vineyards, except when the growth was exceedingly strong, that one wire was sufficient. He put his posts 20 in. out of the ground and used one wire instead of three, which meant a great saving. The two-rod system was not so likely to turn over as the one rod. He should have liked Mr. Smith to have given a little information on the matter of grafting on different stocks. Some stocks would not graft, as he had proved by dearly-bought experience in the case of Zante currants. This year they had grafted Zante currants on Muscat, and he thought many others would want to do the same, as currants would pay very much better than raisins.

In reply to a question, Mr. HARDY said to bring currants into anything like bearing it would take something like £14 per acre, as an expensive method of trellising was required. Mr. Wigley had a result of between £8 and £9 per acre from currants that been planted for six years.

Mr. SMITH had some seven years old, and had got 3 tons to the acre this year. Currants would not do well in windy situations. They ought to do well at the foot of hills around Kapunda and on sandstone ground. In grafting it was necessary to use the very best wood procurable. He had had some failures in grafting Frontignac on Reisling.

### Defects of Farming.

Mr. J. VON BERTOUCH read a long paper on "Defects of Farming in the Eastern Hundreds, and how to Improve the Present System," of which the following is an abstract:—

He first pointed out where he had noticed, in his frequent travels round the district, the farmers were at fault in their methods of farming, and the effects of such faults. He was referring to the district round and to the east of Endunda, and considered much improvement might be effected in the following directions:—Instead of annual tilling of the same large

areas, put in half the area in a thorough manner on the most approved methods. The yield will be almost if not quite as large at half the labor and expense. Put more land under fallow, and by this means also kill the weeds. Have the land ploughed, but wait for seeding until after the first rains have started the weeds, which will be destroyed by seeding operations. One day's harrowing when the weeds first come up will kill more than a whole week's work after the roots have got a good hold. In many parts of the Murray Flats the surface soil is loose for about 4in., resting on a more solid subsoil. In this class of soil deep ploughing is conducive to "takeall," though subsoiling in such land will be profitable. Deep ploughing in deeper soil is desirable. Wherever possible get a seed and fertiliser drill, and use commercial fertilisers. Save all farmyard manure, and make use of it as far as it will go. To use the drill even without manure is better than sowing broadcast. The hay should be removed from the field as quickly as possible, to prevent deterioration. Cut portion of the crop with binder as a means of providing food for stock, and also as a partial security against damage by storms, weather, &c. By the use of the binder the land can also be cleared of weeds. Throughout the eastern hundreds there is not, he believed, a single silo. A lot of fodder is wasted in good seasons which, at very little expense, could be conserved in silos. Very few farmers keep sheep, and where the farms are small there may be some reason for it: but he believed it would pay several farmers to combine to keep a small flock to provide food for the house, clear the land of weeds, and bring in a little money for wool and skins. Such co-operation would not be so good as keeping a flock of your own, but it is better than none at all. Then attention should be paid to the saving of straw for fodder and for bedding for horses. Weeds should not be allowed to get a hold. The barley grass is taking a strong hold in many parts, and will be a serious trouble. More attention should be paid to the quality of cows. Those generally kept were most inferior, and naturally unprofitable. Then poultry-keeping should be carried on in a systematic manner. By keeping birds of a good laying strain farmers in the mallee scrub lands could obtain early eggs. The fowls, if allowed a fair run, can pick up nearly all the food they require. At a very trifling cost, and with little trouble, the inferior birds at present kept could be replaced by birds that would prove a distinct source of profit to the owner. Then, as regards water conservation, most farmers' dams are so small that they give out before the summer has really commenced, rendering the heart-breaking and unprofitable work of water-carrying necessary. Here, again, the farmers should combine either to form water trusts or to accept Government schemes that may be offered. In the hills west of the Murray Flats there are many places where, by a few farmers combining, they could conserve sufficient water at little expense to supply the farm stock and also the garden. The same applies to those nearer the river, who could combine to adopt some scheme of pumping water from the river. If this were done there would be few losses of stock, fruit and vegetables for home use could be grown, and fodder plants of various descriptions grown for the cattle, which would then be a source of comfort instead of, as at present, an anxiety to the owner.

Considerable discussion ensued on the use of fertilisers containing lime on limestone country, and on different points in the paper.

**VITICULTURAL STATISTICS**—In 1896, Great Britain imported nearly 14,000,000galls. of wine: France sent nearly 4,500,000galls.; Spain nearly 3,750,000galls.; Portugal, 3,500,000galls.; and Australia, only 696,500galls. During the past eleven years importations from France have increased to the extent of 945,000galls. (principally claret); and from Portugal (port), 386,000galls.; while, on the other hand, Spain sends 415,000galls. less than she did. The total importations of wine into Great Britain has, during the same period, increased to the extent of two millions of gallons annually. South Australia, with an area of 18,500 acres under grapes, produced in 1896-7 nearly 1,500,000galls. of wine, of which 402,677galls., to the value of £81,700, were exported. Victoria, with 30,275 acres of vines, manufactured two and a quarter millions of gallons of wine, of which 379,000galls., valued at £75,000, were exported. New South Wales, with an acreage of 8,061, produced 794,000galls., of which only 44,000galls. were exported. The French wine production for 1897 amounted to 712,000,000galls., a falling off of 271,000,000galls. as compared with the previous year. Italy produced 624,717,280galls., an increase of nearly 54,000,000 over the 1896 yield. The total yield of Australia for 1896-7 was estimated at four and three-quarter million gallons, only about 8 per cent. of one year's increase shown in Italy.

## CENTRAL AGRICULTURAL BUREAU.

MONDAY, APRIL 18.

Present—Messrs. F. E. H. W. Krichauff (Chairman), Samuel Goode, W. C. Grasby, Thos. Hardy, T. Price, M.P., T. B. Robson, Hon. A. W. Sandford, M.L.C., C. J. Valentine, and A. Molineux (Secretary).

**Finance.**

The Finance Committee reported expenditure to date for contingencies, £755 9s. 8d.; balance, £44 10s. 4d. Accounts to the amount of £38 15s. 1d. were passed for payment. The committee reported that an excess warrant for £350 had been approved by the Minister and was now before Cabinet.

It was decided to request that the line for printing the *Journal of Agriculture and Industry* should be kept separate on the sub-estimates from the ordinary contingencies vote of the Bureau.

**Congress.**

It was decided that the Tenth Annual Congress of the Bureau should be held in Adelaide during Show week, next September, and that the members of Branches and others be invited to submit practical papers on matters of general interest to the producers for discussion at the Congress meetings.

**Queensland Fruit Fly.**

The SECRETARY called attention to the discovery of the fruit fly in bananas at Sydney. As these bananas were not allowed in there, it was quite likely that they would be sent on to Melbourne and Adelaide, and he thought that in order to prevent the introduction of this dreaded pest it should be made compulsory for all importations of fruit and plants to be subjected to fumigation at Port Adelaide. This would also prevent the introduction on trees, plants, or fruit of the dreaded San Jose scale, besides those more common in the eastern colonies.

Members generally agreed that something should be done to prevent the introduction of this pest, but thought that before the Bureau made any recommendation the members should have evidence before them that fumigation would be effectual without injuring the fruit or causing any very appreciable expense.

The SECRETARY pointed out that there was no doubt fumigation with hydro-cyanic acid gas would kill all living insects without destroying the plants, but he had no evidence as to its effect on soft fruits or on the eggs of insects. Whatever was done required to be done early, as the bananas were arriving every day, and it was impossible to ascertain for certain by simple examination whether they were infected or not.

After further discussion, the following resolution, moved by Mr. Sandford and seconded by Mr. Hardy, was carried:—"That the Secretary supply to our next meeting evidence concerning the results of the application of hydro-cyanic acid gas to plants and fruits—especially those that have been attacked by the fruit fly—also cost of erection of necessary plant and chambers, and estimated cost per bushel of treating the fruit, and whether the unpacking and handling injures the keeping qualities of fruit so treated."

The Secretary was instructed to call a special meeting of the Bureau as soon as this information was available.

**The Phylloxera Bill.**

In reply to request by Mr. Price for a statement concerning the amended Phylloxera Bill, Mr. Hardy said that if the German vigneron at Tanunda who



signed the petition against this Bill had properly understood what they would be liable to if the phylloxera appeared amongst their vineyards, he believed not one of them would have signed the petition. Under the Vine, Fruit, and Vegetable Protection Act they would have to grub up their vines at their own cost, and would not receive a penny in compensation. During his recent visit to Victoria he learned that the Government intended to bring in a Bill early next session to do away with compensation, being forced to this action by the extraordinary claims made by the owners of vineyards which had been destroyed, and to the growing opinion that it was unjust to saddle the whole of the taxpayers with expenses that should be borne by the vignerons themselves. At the Cape the Government spent £20,000 a year for four years endeavoring to stamp out the pest, without avail. Was it likely that the Government and people of South Australia would begin what had proved a failure elsewhere? The only chance of stamping out or, failing that, arresting the spread of the phylloxera when it does appear is to be in a position to take vigorous and instant action; and this can only be done, as far as he could see, by passing the Phylloxera Bill, with the alterations suggested in the petition presented to Parliament by a large number of vignerons last session. Careful watch for and guard against the appearance of the pest and immediate and vigorous action when necessary were the only safeguards of the growers; and there must be funds available if this work is to be done. The low prices paid for grapes last year had a great deal to do with the objection to the Bill, but with intercolonial free trade prices would improve, and the taxation of 6d. per acre per annum will not be objected to when the advantages to be derived from the passing of the Bill are well considered. He thought it the duty of the Government to bring the amended Bill forward again and get it passed in the interests of the vinegrowers and the general public.

Mr. PRICE said he was glad to hear Mr. Hardy's opinion. He was convinced himself that there would be little opposition to the provisions of the Bill if the growers only understood the necessity for being prepared to deal with the pest should it be introduced.

### **Donations and Exchanges.**

The SECRETARY reported receipt of usual exchanges from various agricultural departments and institutions.

#### **Pears.**

Mr. ROBSON tabled sample of the true Duchess de Angouleme pear, quite distinct from Williams' Bon Chretien or Bartlett, which is usually called Duchess here. He also tabled sample of Keiffer's Hybrid pear.

#### **Raisins.**

Mr. GRASBY tabled several samples of raisins—one of Smyrna sultanas and one dried by him-self—the fruit being first dipped in an emulsion of potash, olive oil, and water. The local raisins were smaller, but almost as good in color, and better in texture and quality than the Smyrna raisins. Also sample of Eleme raisins from Smyrna, dried from Rosaki grape, of large size and good flavor, and samples of local muscatels dipped in potash and oil emulsion before drying. In the one case the grapes were dipped in a hot solution and dried in five days, in the other the solution was cold, the raisins taking nine days to cure, while untreated muscatels took up to three weeks. The muscatels were not as large or as light colored as the Elemes, but were otherwise similar. The Rosaki grape was a good table grape, and a long keeper, but we had not got this variety here.

Mr. HARDY said it was noticeable that our local raisins and currants were generally smaller, but better in quality than the imported.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers :—

206. *Oats as Horsefeed.*—In an article in the *Landwirthschafts Blatt fuer Oldenburg* oats is named the best food for horses. Although maize is a good food for horses, giving them flesh, they respire too much after it. Oats contain also the "avenin," which consists of matters that stimulate, giving nerve and courage and helps digestion; but it should not be quite new from the thrashing floor. It should have time to sweat in bulk, and thereby go through a kind of fermentation. To feed foals with oats, besides hay and grass, during the first year is much recommended, as experience has shown that it gives them power and nerve, and they are likely to be useful for a greater number of years. In the second year, geldings only should receive oats as before; but the young stallions and fillies very little, which can be increased again in the third year.

207. *Defoliation of Mango's and Sugar Beet.*—Frequently farmers advise to remove the lower leaves, believing that the roots will reap an advantage from the procedure. This is, however, a great mistake, as the leaves are preparing the material for the growth of the root, the same as they do for other plants, by altering the carbonic acid of the air into starch. The roots may perhaps weigh as much if they are deprived of their lower leaves as others with the leaves untouched, but the water absorbed by the roots could not be expelled or exhaled by a sufficient number of leaves. The roots become poor in substance and watery. Sugar beet would be quite poor as regards sugar, and any increase in size merely represents water.

208. *Broom Corn* is subject to the fungus *Clavaria Sorghi vulgaris*. It is not an Ustilago. The spores enter the young plant at the time of germination of the seed. As the plant grows the fungus also grows upwards in it in the form of threads. At the time the organs of fructification are being formed these threads increase in the cells under the epidermis, loose their connection, and form a downy mass of spores, which may germinate at once if they find sufficient moisture, or after years by being immersed for some little time in water. Spores mixed with the seeds before sowing are sure to produce infected plants; but if spores are spread over the young plants, these remain healthy. Even if you think that you are quite sure of having seed which is not infected, it is better not to dispense with putting it for ten to fifteen minutes into water of 135° F. A higher temperature might be injurious, while a lower one would not kill the spores. In Kansas and Illinois 200,000 acres were in 1895 under broom corn.

209. *Feeding of Pigs.*—Professor Lehmann, of Goettingen, states that the bacon of pigs fed on oil cakes is of less value—not hard enough and tasting of fish oil; and many farmers of Schleswig Holstein assert that feeding with rice-meal did not produce so good meat and bacon as with bran and potatoes, maize being still superior to the latter. Rice-meal made the pigs more or less stiff, in fact one of them was moving about on his knees and the knee-joints were full of blood.

210. *Deep Cultivation* in most instances increases the returns, but the real question is, does it pay? If a soil is such that water and air can only with difficulty permeate it, deep cultivation will prepare it for a deeper penetration of the roots. A naturally porous subsoil will require it far less. All plants are not equally grateful for deep cultivation. Wheat, rye, barley, oats, and others will send their main roots deep down, and spread them also near the surface, and these, consequently, quickly respond to a topdressing of manure. Potatoes, rape, root crops, peas, beans, and clover like a deep soil, and without it will not grow a full crop. The experiments made by Professor Wollny, of Munich, do not quite verify the above remarks. The soil of the field had been cropped from 1885 to 1889 with potatoes, consisted of a mild, fine, sandy soil, containing humus, which rested 14 in. deep on a perfectly penetrable gravelly subsoil, and was mechanically and chemically equal. Plots of four square metres were separated by paths one and a half metres wide. On half of the plots the soil was forked only 7 in. deep, on the other half it was forked 7 in. deep, thrown aside, and filled in again after subsoil had been also forked 7 in. deep. Most of the plots received no manure, except on a few, where the effect of such was deemed desirable in conjunction with deep cultivation. The results given seem to show that it does not pay to use deep cultivation for cereals, except perhaps in deep clay soil. For maize alone deep cultivation proved payable. Although peas and beans send their roots down deep, they were not very grateful for deep cultivation, probably because their many branch roots enable them to spread nearer the surface whenever the main roots cannot penetrate deeper. All the root crops and potatoes showed greatly increased payable crops.

Mr. GOODE had seen wheat with the main root quite 3 ft. long. When the seed germinates the main root goes down, and with the warm weather the surface roots form. These surface roots are the principal feeders, but on the deep roots the plant depends for its moisture during hot weather. His experience was that deep cultivation for wheat was decidedly profitable. In

England he used to follow the plough with another without a mouldboard, running in the furrow and turning over the soil to a depth of 6in. to 9in., if possible. His experience in South Australia was in favor of deep cultivation for wheat. With hops it was the same. Plough as deeply as possible during autumn, but in the warm weather get the land as smooth as possible, and, if you cultivate, only scratch the surface.

The CHAIRMAN said his own experience in this colony was that he got his best crops on the land that had been cultivated deeper than usual.

Mr. HARDY strongly recommended farmers to try the experiment for themselves. Last season he had some heavy land at McLaren Vale under hay, and when ploughing it up for seeding a strip through the field was ploughed deeper than the rest. He could see no difference, however, in the crop.

### Leave of Absence.

Mr. Hardy was granted leave of absence on account of his intended visit to England.

### New Branches.

The establishment of Branches of the Bureau in the undermentioned districts was approved:—Brinkworth—Members: Messrs. W. Wundke, C. Ottens, J. Graham, J. Chesson, S. Aunger, R. Cooper, J. F. Everett, H. Weckert, J. Stott, and W. H. Pearce. Franklin Harbor—Members: Messrs. D. McKenzie, E. Wake, J. Foulds, W. Beincke, J. Ellaway, sen., W. Ward, J. Syles, J. Story, J. Harvey, H. Dunn, W. Spence, J. Ward, sen., J. Spence, sen., C. L. DuBois, and G. Wheeler.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Johnsburg, Mr. H. Arnold; Dawson, Messrs. A. J. Hooper, C. Stoneman; Meadows, Mr. T. G. Grigg; Woolundunga, Mr. A. S. Gunning; Onctree Hill, Mr. T. S. Harvey; Koolunga, Mr. W. J. Jose; Renmark, Messrs. J. T. McGarvie, M. Chapin; Lucindale, Mr. A. Lobban; Clare, Messrs. W. G. Lewcock, — McCarthy; Albert, Messrs. G. S. Munn, A. B. Struther; Auburn, Messrs. D. A. Lyall, J. B. Schober; Golden Grove, Messrs. J. R. Smart, H. P. Day, A. Roberts, A. Robertson, J. Murphy, J. Ross; Mundoorra, Mr. J. J. Vanstone; Forest Range, Mr. Jas. Caldwell; Port Pirie, Mr. R. J. Ferry.

### Reports of Meetings.

The SECRETARY reported receipt since previous meeting of fifty-five reports of Branch meetings.

## REPORTS BY BRANCHES.

### Mylor, April 2.

Present—Messrs. W. H. Hughes (Chairman), J. Roebuck, S. W. Jackman, P. Probert, F. Rosser, E. J. Oinn, W. T. Elliott, S. Pearce, W. G. Clough (Hon. Sec.), and seven visitors.

EXHIBITS.—Mr. Oinn tabled two samples of apples which the members were of opinion were incorrectly named, and it was decided to forward them to the Central Bureau for identification. Some discussion followed on the cause of black spot. [It is caused by a parasitic fungus known as *Fusicladium*.—GEN. SEC.]

GUMMING OF CHERRY TREES.—Mr. Oinn read a paper on this subject. He was inclined to attribute gumming to the effects of frost. Other members

put it down to cold soil and excess of sap. ["Gumming" on stone fruits is caused by a bacillus called *Coryneum Beijerinckii*, which attacks the sap of a plant where a wound has been made in the bark. The sap is converted into gum, and it causes the wound to extend. The cure is to cut all back to sound bark, paint over the whole surface, and then sprinkle fine sand on the wet paint. To prevent gumming take care not to wound the bark in any way.—GEN. SEC.].

**WORK FOR APRIL.**—Sow early green feed on high land.

### Stockport, April 4.

Present—Messrs. F. Watts (Chairman), C. W. Smith, T. Megaw, T. Howard, D. G. Stribling, J. Smith, J. Smith, jun., G. Burdon, and J. Murray (Hon. Sec.).

**MANAGEMENT OF HORSES.**—Mr. C. W. Smith read a paper on the care of the team, and the preservation, &c., of harness. He advised beating the collars when dry to shake out the dust and soften them so that they fit the horses' shoulders better. A hard collar causes sores. The hame hooks should be well up on the collar, as it is easier for the horse than if low down. Backbands should always be used to ease the shoulders of the weight of the swingletrees when spelling. The team should not be hurried in turning, as they are likely to knock each others' feet if turned quickly, sometimes causing lameness. The teams should be well balanced, as an old horse cannot be expected to work as fast as a young, strong animal. Do not use the reins as a whip, but rather carry a light handy whip, and give a sharp cut with this if necessary. When starting seeding the horses should be allowed to take it easy for a few days until their shoulders become a bit hard.

### Bowhill, March 19.

Present—Messrs. W. G. F. Plummer (Chairman), J. G. Whitfield, C. Drogemuller, J. Gregory, J. Whitehead, and H. H. Plummer (Hon. Sec.).

**BRANCH SHOW.**—Matters in connection with the proposed show of produce, under the auspices of the River Murray Branches, were dealt with, and it was decided to call a meeting of delegates at an early date to make further arrangements.

**EXPERIMENTS.**—Mr. Drogemuller reported favorably on Quantity Pea, which was a very quick grower and produced large, well-filled pods. Quality Pea did not do so well. Kaffir Corn, irrigated, had grown splendidly; other seeds had failed to grow. The Chairman said nearly all his seed failed to grow, and on digging up the soil a few days ago he found them still in sound condition, the rainfall having been insufficient to cause them to germinate.

**MANAGEMENT OF HORSES.**—Mr. Whitfield read a short paper on this subject. He considered young stock were often cruelly treated when breaking them in. They were run into a yard, roped, and harnessed, and allowed to buck and rear in attempting to gain their accustomed freedom until tired out. They are often cruelly whipped or beaten when being broken in, and it frequently happens that some are injured more or less seriously during the operation. Where foals are reared on the farm they should be allowed in the stable, and tied up occasionally to get them used to handling. When breaking them in, treat them kindly and lead or drive them until they get used to the harness. Members agreed that kindness should be exercised in dealing with young stock, and that almost any animal could be trained and broken in without being ill-treated.

### Port Lincoln, March 18.

Present—Messrs. S. Valentine (Chairman), J. D. Bruce, W. Laidlaw, W. E. Goode, J. P. Barraud, E. Chapman, and John Anderson (Hon. Sec.).

**CATTLE DISEASE.**—The Chairman directed attention to a disease which had broken out amongst cattle at Green Patch. They appeared to be paralysed in in the hind quarters, falling down, and unable to rise again. Several had died.

**ARBORICULTURE.**—The Chairman read the following paper:—

As so few people have planted trees, or taken much interest in arboriculture, I thought I might give a few hints on planting, and perhaps arouse a little interest in the matter.

In the first place, always have your ground ready for the trees in good time. I find ploughing in April and May the best, as the ground gets nearly all the winter's rain on it, and is then in a fit state to retain the moisture.

Plough the ground as deeply as you can, as long as you do not turn up any of the subsoil. From 6in. to 9in. is the best. In what we call "heath land" in this district, however, never bring any of the gravel to the surface; if you do you will find the trees do not do nearly as well, and you will get very little grass to grow on the ground afterwards. This also applies to all crops, as nothing seems to do well on the ground if the gravel is brought to the top. This means only ploughing from 3in. to 6in. deep, according to the depth of the soil overlaying the gravel. If you can attach a subsoiler, such as a scarifier-tooth, behind the mould board of your plough, so as to stir up the undersoil in the furrow, so much the better; but I get very good results from only turning over the surface soil. In deciding what trees to plant, you will, of course, consider what sorts are suitable to your soil and requirements. I will give a description of a few of what I consider are the best for planting. Of the gums, the redgum (*Eucalyptus rostrata*) is by far the best timber we have in the colony; but as it will only grow on moist, loamy soil, such as in gullies, creek banks, and flats, it can only be planted to a limited extent. The timber is used for piles, sleepers, posts, rafters, decking, and I have seen it used in cabinet-work, but its great weight militates against its use in that work. It, however, makes splendid veneers, polishing beautifully. The bluegum (*Eucalyptus leucocylon*) comes next in value for timber purposes, being used for felloes, naves, all sorts of wagon-work, bridges, rafters, posts, swings, &c. It grows well on most soils, but seems to make the best timber from trees grown on a poorish soil overlaying limestone. The sugargum (*Eucalyptus corymbosa*) is the tree generally planted, as it is a quick-growing pretty tree, and grows on nearly any soil, as long as there is not too much moisture in it. The timber is not so good as red or blue gum, but is very fair in quality, and fit for all kinds of farm work, sleepers, &c. Another good gum is the toart (*Eucalyptus gomphocephala*). The timber is used largely for felloes, naves, and all sorts of wheelwrights' work, and stands fairly well in the ground. It grows well on moist, loamy, calcareous soils, and has done very well with me on about 6in. of soil overlaying limestone. It is a pretty tree, and a fast grower.

Of the pines the Remarkable (*P. insignis*) seems to be the best that gives satisfactory results in this colony. It grows best on a good sandy loam with clay subsoil, but does well in most situations here. It makes a very fair deal timber, is a fast grower, and nice-looking tree.

The Aleppo pine (*Pinus halepensis*) is another good pine, and seems to do better in this district than *Pinus insignis*. It makes good shelter belts, as it is more bushy and stands the cold sea winds better than any other tree I know. It is a fairly quick grower, and does best on a good loamy sand, but does well on nearly any soil we have here. It makes a medium deal timber.

Another tree that is really worth planting by farmers and stockowners is the Carob (*Ceratonia siliqua*). It is a hardy evergreen tree with dark-green foliage, does well on limestone soils, makes a splendid shelter, and the beans are good fodder for stock.

A tree that should be grown much more extensively for fodder is the tree lucern (*Cytisus proliferus*). I had a row in this year, and found them very handy, as all the clippings (and they stand very hard cutting) I could get my cows eat up greedily. If farmers were to put in a few acres, planting in rows 10ft. apart and 4ft. in the rows, they would have a splendid standby when all the other feed was dry or gone.

Last but not least is the Sheoak (*Casuarina quadrivalvis*). In this district particularly the sheoak is the most valuable tree we have. The timber makes good handles for tools, spokes, swings, and any work where it does not come in contact with the ground. It is the best firewood you can get, and is a splendid fodder tree.

When you have made your choice of trees, wherever you procure them, see that you get medium sized stocky trees; don't have tall spindly trees because they are big, they have been forced, or are too old, and if in pots will very likely be pot-bound, and will give poor results when planted out. When taking them home see that the roots are well covered from sun and air. When you get them home, if open roots, heel them in the ground and give some water, and if pots or bamboos, water and put in a shady place. Of the trees I have mentioned, red,

blue, and tourt gums, pines, carobs, and sheaoks should be planted out in July; sugargums should be kept until the worst frosts are over, September being the best time for them.

Choose cool cloudy weather for planting, and get your trees in as quickly as possible, spreading the roots out well when putting them in the holes. I don't believe in large holes; if the ground is well ploughed—as it should be—just make the hole (square) large enough to take in the roots comfortably; make the soil that you fill up with nice and fine. If you can get the sugargums in bamboo tubes they are by far the best, as they are very little trouble to plant, putting bamboo and all in the ground, and they stand the late planting and dry weather better. Carobs should either be pot plants or the seed sown where the tree is wanted to grow, as if the tap root is broken they will die. The other plants may either be in pots or open root. In planting tree lucern I find the best way is to sow the seeds where you want the trees to grow. If strips are ploughed the same as for wattle-planting, three or four furrows wide 10ft. apart, and the seed sown in the middle of the ploughing, it is cheaper than ploughing the whole paddock, and the lucern will do nearly as well. Sow the seeds about the end of August to beginning of September, soaking in warm water over night. You can then thin out plants to 4ft in rows, and use the thinnings for filling up misses. I find they transplant readily even when they are 18in. to 2ft. high. They will be fit to turn stock in for a short time in the following April; but you must see that they are not eaten too low, and keep the stock out until they have made fresh growth.

About three or four weeks after planting, go over all your plantations and hoe around the trees, loosening the surface soil, not deeper than 2in., and, if possible, hoe around them after every rain during the summer, and you will find you will have very few misses, and in a few years will have timber for your own use without having to run to the timber merchant for every piece you want. The farm will be improved in value by the presence of the timber, and the stock will have shade in summer and shelter in winter from cold winds, and will be more healthy and in better condition. The crops will also not be so liable to damage from heavy winds shaking out the grain, &c.

I am afraid my paper is rather long, but it is a hard matter to condense so varied a subject and give all the information necessary. In conclusion, if the mallee farmers, instead of clearing all the mallee from their paddocks, were to leave a belt around each, we would not have heard of so much damage occurring through the wind blowing the top soil off the paddocks as has been done this year on the Murray flats.

### Auburn, April 7.

Present—Messrs. J. E. Isaacson (Chairman), W. R. Klau, S. Ford, J. Hean, P. Cornwell, J. W. Yeatman (Hon. Sec.), and two visitors.

FALLOW.—A visitor asked the opinion of members as to the advantage or otherwise of fallowed land being left rough or reduced to a fine tilth. In Scotland it is usual in breaking up grass land to plough with a high-cutting single-furrow plough, raising a high-ridge furrow. Another visitor remarked that land left here in such a state would grow a great quantity of weeds, and be difficult to keep clean. Mr. Hean favored a high-ridge furrow and subsequent working to obtain a fine tilth. It was a bad plan to turn the land too flat, and had seen very poor crops grown on land that had been broken up with the old Hornsby plough in ploughing matches on this account. With regard to ploughing red land in vineyards, the inquirer had found it a mistake to work it too fine; as, in case of summer rains, when it could not be touched on account of the vines, it set down much harder than where it was left somewhat rough. In regard to depth of ploughing, Mr. Klau had noticed where stumps had been grubbed the growth of wheat plants was not better than elsewhere.

### Albert, April 2.

Present—Messrs. J. Wetherall (Chairman), T. Cooper, G. Haggard H. L. Lanc, J. Brewin, H. L. Smith (Hon. Sec.), and three visitors.

HAY.—Mr. G. Haggard advocated growth of oats for hay, as he thought this cereal did better than wheat on the light Murray soils. Several members thought this crop is worthy of a trial.

**EXPERIMENTS.**—Members decided to try quicklime on the heavy clay soils. Mr. Wetherall reported Quality and Quantity peas as very fair croppers; but Laxton's Evolution was a failure.

### Golden Grove, April 7.

Present—Messrs. T. G. McPharlin (Chairman), S. A. Milne, John McEwin, W. J. Rehn, A. Harper (Hon. Sec.), and three visitors.

**USE OF COMMERCIAL FERTILISERS.**—A discussion was initiated by the Chairman upon the question of the desirableness of using commercial fertilisers for wheat or hay crops. He considered the prospects of a good season were promising, and that it was probable that hay would be low in value. After much consideration members generally concluded that any modification either in kind or quantity would not be desirable until more experience has been gained, either with wheat or hay. Mr. Milne considered that, as a general rule, commercial fertilisers were more advantageous for production of grain than of straw.

### Quorn, April 9.

Present—Messrs. John Cook (Chairman), F. Herde, G. Altmann, C. Potter, James Cook, and A. F. Noll (Hon. Sec.).

**SCARIFYING.**—Mr. Herde read the following paper:—

For the land of our plains my opinion, supported by experience, is that scarifying is preferable to ploughing for seeding purposes, especially on the saltbush and bluebush country, as most of our soils are of a loose nature. The scarifier does the better work, and the soil will set better; but weeds must be kept down. In dry seasons scarified land will give a larger return; but it must be harrowed. A piece of scarified land was left not harrowed one season, and directly the hot weather set in the crop failed more and the plants did not stool out equally with the crop on the harrowed land next adjacent. If land has been once ploughed it should be scarified and harrowed for the two following crops, provided it is free from weeds. Have tried following with the scarifier last season. Will report later on.

Members agreed that ploughing is the proper mode of cultivation, though scarifying may give good results in some cases where the soil is very loose and clean. Scientific farming is of no avail unless there is a sufficient rainfall; and in bad seasons the solid badly-cultivated land often yields the best return; but this should not deter the farmer from cultivating his land well, and thus to assist nature in every possible way.

**EXHIBITS.**—Mr. Altmann tabled Dart's Imperial and Budd's Rust-resistant wheats in grain and straw, the latter being the better and stronger in growth; both are worthy of further trial. The Hon. Secretary tabled Dart's Imperial and two Queensland varieties of wheat for distribution, the latter being much shrivelled. He said that in order to find out the relative value of new wheats it was necessary to grow them in plots side by side on soil of equal quality with the kinds of wheat ordinarily cultivated. This would show which is the earliest and strongest grower, and best adapted to the district.

**EXPERIMENTS.**—The Hon. Secretary reported that he had sown seeds of several varieties of summer plants, and all of the cow pea, red Kaffir corn, sorghum, melons, &c., saved from the previous sowing, but none came up owing to the long drought.

### Gawler River, April 4.

Present—Messrs. A. M. Dawkins (Chairman), A. Bray, J. Hillier, F. Roediger, A. Hatcher, T. P. Parker, H. Roediger (Hon. Sec.), and two visitors.

**GREEN FODDER.**—Mr. T. P. Parker said that rye makes the quickest growth for green fodder, but he did not consider it the best. Barley is better liked by cattle and horses, and should be sown for a little later feed.

**FEEDING DAIRY CATTLE.**—The Hon. Secretary said he had experimented with copra cake v. bran, giving the same weight of each, and the result was in favor of bran for butter production, but copra cake was better for fattening purposes. He fed his cows on good green hay—not headed straw—and bran mixed with wheaten chaff, giving occasionally some green lucern or Jersey tree kale, which gave good results. He suggested that more lucern and kale should be grown where possible, as this proved the cheaper food. Hay should be cut early, as this gave better results than when allowed to set grain before cutting it. Mr. H. T. Parker said that he fed molasses mixed with wheaten chaff with advantage to his horses in the late time of scarcity.

**RAINFALL.**—For March, 0·430in.; for April 1 till April 9, 1·850in.

### Port Elliot, March 26.

**Present**—Messrs. C. H. Hussey (Chairman), H. Pannell, E. Wood, W. E. Hargreaves, W. E. Darwin, H. Green, G. Pearce, F. T. Fischer, J. Brown, and E. Hill (Hon. Sec.).

**QUESTION FOR BRANCHES.**—This branch desires that all other branches will consider whether or not the State should bear a portion of the cost of quarantine for imported cattle.

### Port Broughton, April 4.

**Present**—Messrs. R. W. Bawden (Chairman), George Pattingale, J. Harford, B. Excell, W. R. Whittaker, J. Barclay, J. Bates, E. Denniss, R. Storr, H. H. Whittle, W. Tonkin, and S. M. Bawden (Hon. Sec.).

**COMBINED BRANCH SHOW.**—Messrs. R. W. Bawden, J. Harford, and J. Barclay were appointed to act on a committee of delegates from Mundoorra and Pine Forest Branches to arrange prize-lists, &c., for a combined Branch show, to be held during next September.

**BEST WHEAT.**—Members considered that Steinwedel wheat gave best results last season for grain, and White Tuscan and Ward's Prolific are best for hay.

**SEASON.**—Splendid rains have fallen and feed is growing fast. Grapes gave a poor crop, and apricots and peaches were fairly good.

**HOW TO SPOIL A HORSE.**—Mr. R. W. Bawden read the following paper:—

A humorous article on "How to Spoil a Horse" appears in a recent issue of an American journal. Here are some of the suggestions: If you have occasion to stop on the street, either do not tie the horse at all or tie him to something to take with him if he wants to get away. If the weather is chilly, it will toughen him to leave him uncovered; but should you choose to blanket him, throw the blanket over him so loosely that the first breeze will turn it over his head. A cool wind blowing on the chest of a heated horse will refresh him greatly, and if he stands in the gutter with melted snow and ice water washing around his heels, so much the better. When you return to the stable let the horse cover the last few rods at the top of his speed, and pull him up with a loud triumphant "Whoa!" And do not miss a glorious opportunity of trying the disposition of the animal: Unfasten all the attaching straps but one holdback, and start the horse out of the shafts. When you see the result, yell like a fiend. The strap that remains fastened will first make the shafts punch him in the stomach, then pull all the harness off his back. If he does not kick, it is a sign he is a good horse: there is no wild horse in him. If it is winter, and the horse much heated, either leave him in the stable unblanketed, or put the blanket on at once and leave it on all night wet. A draught of cold air from the opening above the manger to the door behind blowing the whole length of his body will help to season him. If it is summer, slop his joints with cold water, and give him a couple of swallows to drink. A couple means any number from two to a hundred. If the horse is tired and exhausted, do not forget to feed him at once. He might starve to death if



you left him for an hour. A heavy feed of corn will please him greatly, and a generous allowance of corn meal will make him look nice and fat—probably before morning. A liberal dose of pepper, ginger, or condition powders will scare away any evil spirits that may be hovering about, and make every thing all right. If the horse is not dead by the next morning you can fix him up at your leisure, and thereafter consequently recommend him as tough. But should he be so unreasonable as to die during the night, you can console yourself with the reflection that it was not your fault—the animal was constitutionally weak.

SEASON.—Splendid rains have fallen and feed is growing rapidly.

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### Nantawarra, April 5.

Present—Messrs. S. Sleep (Chairman), James Nicholls, A. H. Herbert, J. W. Dall, R. Nicholls, R. Uppill, C. Belling, H. J. C. Meyers, and T. Dixon (Hon. Sec.).

SHEEP DYING.—The Hon. Secretary reported that Mr. Uppill had removed his sheep to another place, and no more had died. Mr. Jas. Nicholls said that a farmer at Inkerman had told him that sheep in poor country die apparently from the same cause as Mr. Uphill's, and he recommended sulphate of iron as a remedy.

TRUCKING PIGS.—It was mentioned that the cost of trucking pigs per rail was higher now than before the alteration in rates had taken place, and it was decided that Mr. Dall should see the Commissioner and endeavor to secure more favorable terms.

FIELD TRIAL.—Decided that the next combined Branches field trial of implements, &c., shall be holden at Bute, during August next, on the Wednesday of or preceding full moon. [Full moons on Tuesday, 2nd, and Wednesday, 31st August.—GEN. SEC.]. It was mentioned that the latest field trial had not been very successful, on account, probably, of being held so far away from a railway station.

PICKLING WHEAT.—After a long discussion, in which many methods of pickling seed wheat were mentioned, it was resolved that pickling with bluestone, if properly done, is a preventive of bunt. It was stated that a certain farmer never sowed bunted wheat and never pickled his seed, and he had never grown a bunted crop.

DANISH ISLAND OATS.—Mr. Meyers reported that Danish Island oats did well until the hot weather came in September, when they failed. He had nursed a few plants through the drought and secured a few heads, which were eventually eaten by caterpillars, with exception of a few shrivelled grains. He thought this variety unsuited to the district, as the grain does not ripen until Christmas.

STOCK.—Live stock fed exclusively in the paddocks are falling off in condition. It is necessary to supply cattle with other food than the natural herbage.

RAINFALL.—Up till 10th over half an inch has fallen during April, and this will start feed and set the farmers tilling.

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### Petersburg, April 9.

Present—Messrs. W. Miller (Chairman), R. Cochrane, E. Palmer, T. Selby, F. W. Sambell, W. Heithersay, A. W. Jamieson, W. Waters, H. Earle, J. Wilson (Hon. Sec.), and one visitor.

INTENSE CULTURE.—Some discussion took place on the statement made in the *Chronicle* that a resident of Enfield had last year cleared £10 from a plot

of land 40ft. square. Members expressed a strong desire for particulars concerning the produce grown, yields, prices, &c.

**TREE-PLANTING.**—Considerable discussion took place on the following paper, read at previous meeting by Mr. Earle, on planting sugar gums:—

The first thing required is the seed, which can be bought, or picked off the trees in January. To procure the seed from the trees it should be picked and laid on a bag or a sheet for two or three days in the sun. The best plan of sowing is in old jam or fish tins. Put the tins in the fire to melt off the tops and bottoms. Afterwards secure them in shape by tying a piece of binder twine around them. The best time for sowing is early in February. A suitable place should be prepared, sheltered from the south and west winds. If you have a garden, make a shade in it facing the morning sun. The shade need only be a very simple affair: four posts put in the ground, the back two about 2ft. high, and the front two about 3ft. high, with a piece of packing nailed on top. If you have a stone wall, that will do for the back. Level the floor and place the tins closely and evenly thereon. Fill by sifting over them dirt from a decayed wood heap mixed with sandy loam. After sowing the seed cover them with a potato bag. Water plentifully with a watering-can, leaving the bag on until the seed comes up, which will be in less than a week if the weather is warm. Trees raised in the locality will do better than those brought from a distance.

The best places for planting trees are in watercourses or flat ground that retains moisture. The ground should be ploughed up about 7in. deep, or, better still, subsoiled. This work should be done the winter previous to planting, and lie fallow during the summer. Scarify and harrow down fine before planting. Make a small hole with the spade; there is no necessity to dig a large one. The young tree can be planted in the tin, but I advise its removal, care being taken not to disturb the roots. Fill up with fine earth to within about 1in. of the surface, then give the tree a dipper of water. After two or three hours the hole can be filled up to the surface. Unless the weather continues very dry, the young tree will not require any more water. If you commence watering a tree you must continue doing so every two or three days, otherwise it will die. I have had them do very well without watering. August is a good month to plant in, if you protect the young trees from frost. This may be done in a simple way by cutting a wheat bag into three parts, which will protect that number of plants. Drive four pegs in the ground, and stretch one of the pieces of bag round them, having the young tree in the centre. Keep the bag as large at the top as at the bottom (full size of the bag), as the trees require plenty of room and sun; if too much closed up the tree will grow spindly. If the piece of bagging will not keep up it can be nailed to the pegs. If a tree is worth planting, it is worth looking after. A good fence should be erected around the plot planted, and neither horses, cattle, nor sheep allowed to reach them until they are sufficiently grown to be beyond risk of damage.

The sugar gum is the only gum that I can recommend for planting in the North. After the first year it will live and thrive through the most distressing droughts, while gums of other varieties will fade and die, even after reaching the age of several years.

Mr. Palmer strongly advocated tree-planting in this district. The sugar gum had done very well, and the plants of toart gum which were growing in the locality showed that the district was well suited to the growth of this hardy timber tree. He would not recommend the Tasmanian bluegum for this district. As the roots of gum trees were mostly at no great distance from the surface, it was not advisable to plant them anywhere near the garden. Mr. Cadzow (visitor) had been very successful in planting open-rooted sugar and manna gums on the Walloway Plains. He had the land intended for planting ploughed and well worked, then simply made a small hole with a dibble, poured in a little water, inserted the roots of the plant, and pressed the soil round closely. He found October the best time to plant, as there was then very little danger of frost. The Chairman advocated planting other trees in addition to gums; the Remarkable pine being one of the most useful, the timber being valuable. A short time ago he had occasion to pull up a fence erected by a squatter nearly forty years ago, with native pine timber charred at the ends, and found the posts still in a good state of preservation. Several members spoke of the great benefit derived from charring timber as a preservative. Mr. Earle, in reply, said he had confined his paper to sugar gums as it was the only tree that he had proved to thrive in the district with but little attention. Trees should be 14ft. or 15ft. apart, and protected by bagging or other material when first planted. The pods of the sugar gum should be cut

off and laid on some material in the sun, when they would readily shed their seeds. The timber was very strong and durable; even the saplings are very tough, and suitable for scaffold poles, stretchers, rafters, &c., while the old timber was valuable for posts and sleepers.

**STOCK COMPLAINTS.**—In reply to question, Mr. Waters stated he had cured several very bad cases where horses had had a heavy feed of wheat, by giving a bottle of brandy, a bottle of lukewarm water, and a handful of ground ginger or pepper. Water and ginger alone would cure if given soon after the animals get the wheat. Mr. Selby said he found a good drench of yeast a cure for this trouble.

### Forster, April 4.

Present—Messrs. J. Sears (Chairman), F. Towill, J. Prosser, J. Retallack, J. Bolt, W. H. Bennett (Hon. Sec.), and two visitors.

**CO-OPERATION.**—The Hon. Secretary read an article from the *Australasian*, giving particulars of the efforts being made by Victorian farmers to make direct shipments of wheat to England, under the auspices of a combination formed amongst themselves. Considerable discussion ensued on the subject of co-operation.

**HORSE DISEASE.**—Some discussion took place on death of one of the member's horses. Mr. A. Johns stated that the animal died from staggers. It had a wild appearance, feverishness, swelling from the mouth to the forelegs. On being opened the lungs were very rotten, and of a pale color. There was a little sand in the entrails, but nothing serious, and the kidneys were sound.

**DISEASE OF FOWLS**—Members reported prevalence of disease causing death of young fowls. The fowls go blind and their heads swell up, and if pressed exude a lot of matter. They die within two or three days after becoming affected. [All affected birds should be strictly isolated. Feed on bran and pollard mixed with hot water. Give each bird twice a day a large pill of the following roup paste:—Liquorice powder,  $\frac{1}{2}$ oz.; ground ginger,  $\frac{1}{2}$ oz.; cayenne,  $\frac{1}{2}$ oz.; pimento,  $\frac{1}{2}$ oz.; Epsom salts, 1oz.; confection of senna, 1oz., mixed into a stiff paste with treacle. Carefully wash head and face at time of giving pill with a solution of Whalley's disinfectant, say of 1 in 20 strength. For the drinking water dissolve 2ozs. of sulphate of iron (copperas) in a pint of boiling water, and add two tablespoonfuls of this to each quart of drinking water.—[GEN. SEC.]

### Clare, March 11.

Present—Messrs. J. Christison (Chairman), W. Kelly, R. Graham, R. E. H. Hope, J. Radford, J. Treleaven, and W. Kimber (Hon. Sec.).

**APPLES.**—Although the Ribston Pippin was referred to at the previous meeting as being of excellent eating and keeping quality, members would not recommend extensive planting of this variety, because it only does well in localities suited to its requirements. Mr. Kelly stated that fruit of this variety taken from trees growing on the hillsides at Hill River were of very fine flavor, whilst fruit from trees of the same variety grown lower down near the willows was not nearly so good in quality. It was very necessary that soil and situation should be closely studied when planting any kind of fruit tree.

**EXHIBITS.**—By Birks Brothers—Lady Palmerston peaches, averaging 12ozs. each, and of excellent quality. By Mr. W. G. Lewcock—Collection of fruits, amongst them being Jonathan and Prince Alfred apples, very fine; clusters of Reine Claude de Bayay plums; also large onions, one over 2lbs. weight. Several other lots of fruit were tabled.

### Forest Range, April 6.

Present—Messrs. J. Vickers (Chairman), G. Monks, J. B. Fry, A. Green, J. Sharpe, J. Green, C. Stafford, R. Townsend, R. M. Hackett (Hon. Sec.), T. B. Robson (Central Bureau), and five visitors.

**NEW VEGETABLES.**—Mr. Fry tabled samples of White Wonder cucumber grown from Bureau seed, and reported that, though a good bearer and of fair quality, was not suitable for market purposes. [This cucumber, from its prolific nature, good quality, and handy size of the fruit, is one of the best introduced; but, like many of the best of the American varieties of our common vegetables, is not grown here for commercial purposes simply because the color is of a whitish green, and different from the varieties usually grown for market.—GEN. SEC.]

**FRUIT-DRYING.**—Mr. T. B. Robson read the following paper on this subject:—

To dry fruit successfully it is necessary to have suitable trays to spread it on, and in this district some means of artificial drying is most desirable. We will therefore consider these appliances first.

After numerous trials, I have found a tray made of broad Oregon laths, 4ft. 6in. x 1½in., to be the best, and also reasonable in price. At Renmark matchboard trays are used in preference, and they answer very well in hot weather; but I find that after the rains the fruit mildews on them much more than on the lath trays, which allow of a greater circulation of air about the fruit. The trays are made by nailing the laths fairly close side by side to 2½in. x 1½in. cleats, 2ft. 3in. long, at each end; also a thin cross piece in the middle and a couple of diagonal pieces on the under side. On the upper side I have a ¾in. strip nailed all round the tray to keep the fruit from slipping off when turning it. This operation is performed by placing an empty tray upside down over the tray of fruit to be turned and swinging the lot over. Starting with one empty tray, a whole row is soon turned in this way. If rain threatens, these trays can be stacked one over the other—the thickness of the end cleats preventing the fruit from crushing—and covered with sheets of roofing iron, or other material at hand, to keep off the wet.

Evaporators are made in various patterns and principles. The great thing is to get a current of hot dry air to pass through the trays of fruit and carry off the moisture; therefore a column of trays resting one on the other with close fitting sides, so that no air can escape except at the top after passing through all the trays, is the best form. The trays should be about 4in. deep, with wire bottoms, and must rest on a chamber heated by a stove, and air admitted at the bottom to form a draught right through to the top. An old leaky tank sunk in the ground makes a very good chamber for the stove, with an aperture at the top and the trays must be made to fit exactly, to prevent the escape of the hot air. By an arrangement of levers the column of trays may be lifted bodily to admit of a fresh tray being placed underneath. Any handy man can in this way make a very good dryer for himself at a very small cost.

The drying process varies with the nature of the fruit; we will therefore take some of the more important varieties separately.

**Currants** are picked when fully ripe and merely spread in the sun for a few days, when they can be gathered into heaps, and the larger stalks raked out or cleaned in a winnow. The fruit must then be sweated for a fortnight before being tightly pressed into boxes, to keep it free from insects. Sweating is a process which all dried fruit should undergo. It is merely leaving it in bulk, or good-sized boxes, until the fruit that is too dry has absorbed the surplus moisture from that which is not quite dry enough, and the whole is equalised.

**Raisins.**—The grapes should be fully ripe when picked, and, if possible, before the end of March; because after that time the hot weather, so essential to the making of a first-class raisin, is not to be depended on. For table raisins the grapes are placed directly on to the trays, and great care is required to preserve the bloom, which adds to their attractive appearance. With good weather they will dry in about three weeks, and once turning will be sufficient; but more commonly they are much longer, and require frequent turnings after damp weather. Cooking raisins are much more quickly dried. The grapes are scalded in a lye of caustic soda for a few seconds, which destroys the vitality of the skin and bursts its cells. This treatment should not be severe enough to crack open the berries, but sufficient to cause them to turn brown very quickly when spread in the sun, and they will dry in less than a week of hot weather. They should be turned after about two days' drying. Like most fruit, they are dry enough when no moisture will squeeze out of them, and they should then be taken up towards the afternoon, when the stalks are brittle, and stalked by rubbing them over a wire tray, and cleaned in the winnow, and put away to sweat before being finally

packed. They are best packed tightly by screw or lever press, as they are not so liable to be damaged by insects as if left loose.

*Apriots and Peaches* should be as ripe as possible, just firm enough to keep their shape when cut in half and the stone removed. The halves should be placed on the trays cut side up, and may be dried in the sun if the weather is hot, but if at all cloudy or damp, should be evaporated, for the fruit soon spoils if not quickly dried. To get the best color the fruit has to be sulphured, which is done by placing the trays of fruit in the sulphur box before going in the sun and burning sulphur to fumigate it for about an hour. The sulphuring greatly adds to the appearance; but it is at the loss of flavor, and consequently is not recommended for home use.

*Prunes and Plums* must be fully ripe to make a good prune, and if dipped in boiling lye or scalded in boiling water for a longer time they will dry much more quickly. They should not be exposed to too great a heat at first—even the hot sun will spoil them—and when dry enough are put away to sweat. To give them a bright glossy appearance the Californians dip them again in boiling water to which glycerine has been added at the rate of 1lb. to 20galls. One French method is to partially cook them in close vessels, to keep the steam about them; and another is an elaborate method of oven drying at rising temperatures each time they are placed in the oven after being exposed to the air for a time. They are readily dried in the evaporator, which is doubtless the best method for this district.

*Apples* are best dried in the evaporator, as they keep a much better color if dried quickly. They are pared and quartered, or cut into rings by machines, or may be simply pared and cored and dried as pippins. The quarters are nicest when cooked, though when dry the rings may look the best. The best varieties are those with a white flesh, as they have a better color when dried; but there is no inducement to plant drying sorts whilst there is a better market for sorts suitable for export.

In plums we have a considerable number that dry well. They must be sweet and firm, and all the better if freestone. Those with sour skins are unsuitable. The best kinds are the true French prune (*Prune d'Agen*), German prune—often called French in this colony—Italian prune, or Felleberg. There are also several new varieties of prunes lately introduced from California which have not yet been proved. The Ickworth Imperatrice, Blue Imperatrice, and Imperial di Milan dry well. There are also the Golden Drop, Silver prune, and some others of that class that make excellent prunes of a light color, that the public will want educating to.

The yellow fleshed peaches are the most saleable when dried, such as Foster, Crawford, and Muir. The best drying apriots are the Moorpark.

For raisins, both dessert and cooking, the Gordo Blanco is the best we have. The Elemé raisins are larger, and it is a pity the variety they are made from has not yet been introduced.

An interesting discussion followed, and a vote of thanks was accorded to Mr. Robson for his paper.

### Mount Compass, April 12.

Present—Messrs. J. Youlton (Chairman), F. Slater, R. Peters, E. Good, W. Gowling, and two visitors.

**KAFFIR CORN.**—Mr. Slater tabled sample of Kaffir corn grown from Bureau seed. Members considered this promised to be a valuable plant for this district. Other business of local interest was dealt with.

### Lyrup, April 8.

Present—Messrs. A. Thornett (Chairman), F. E. Chick, D. J. Bennett, A. Pomeroy, P. Brown, E. J. Dwyer, A. Weaver, T. Nolan, T. R. Brown, W. H. Walling, W. Healy, W. H. Wilson (Hon. Sec.), and one visitor.

**FINE PEACHES.**—Mr. Sykes sent six large peaches, total weight 4lbs., of Lemon Cling variety. They were grown on a five-year-old tree on peach stocks, the tree being pruned and irrigated in the usual way, but not manured or summer cultivated. The fruit was of good quality and color, and carried well. Mr. Pomeroy stated that a seedling peach set out about three years ago was 12ft. to 14ft. high and 14ft. across, the butt of the tree being 5in. in diameter.

This season it had borne three and a half cases of fruit, some of which was dried and some sent to Adelaide. It proved to be a good carrier and drier.

**LEMONS GUMMING.**—Mr. Healy asked for remedy for gumming of lemon trees. Some members attributed the gumming to stagnant water round the trees, or too deep planting, and advised cutting the bark away to sound wood and covering the wound with tar.

**SALTBUSH.**—Mr. Pomeroy reported that the saltbushes raised from seeds received from the Bureau had grown well and seeded. He had saved a quantity of seed, and recommended the cultivation of the plant on the settlement.

### Balaklava, April 9.

Present—Messrs. G. Reid (Chairman), W. H. Sires, J. Crawford, J. Mills, P. Anderson, J. Willmott, A. Manley, and E. M. Sage (Hon. Sec.).

**SUMMER RAINS.**—Mr. Manley read the following paper on this subject:—

I have been surprised lately to meet many practical and intelligent farmers who have said we do not want rain until the middle of March, and some have said it is better to cart water for two or three months and have the rain later on. In my opinion, if we do not get the summer rain to set up the chemical action and decomposition of the organic matter in the soil and prepare plant food for the succeeding crop, no matter how much rain we have in the winter, it will not do us the same amount of good. While the land is so very dry it is idle, and moisture would set it to work. If you were to take two pots of dry soil and place one in a dry place and keep it dry, and the other keep moist for, say, six months, and then turn them out I think you would find the wet one had improved past recognition. Summer rain generally brings up some herbage, which if it is fodder does the stock good, and if not fodder, and you do not let it seed, does the land good by the roots penetrating the subsoil and opening it up, and when the next crop is growing the young roots follow down the tracks, and if the old roots are decayed they supply some food by the way. I have heard some people say their land has improved since stinkwort came about, and I believe it has. Then, again, there is the ammonia, &c., that the rain would bring down with it, which would enrich the soil more, I think, than many of us give it credit for. Of course I know rains often spoil some feed, but it is more than made up to us afterward. I regret my inability to go into the subject more scientifically, but in my reading I came across the following, in one of A. C. Harmsworth's publications, which I think bears out my idea, and puts it better than I can:—

"We are so used to thinking of the soil as mere mineral matter that it comes quite as a shock to find this is a mistake. As a matter of fact the layer of soft mould which clothes the ground in all cultivable districts, and from which vegetation springs, is actually in great part a living layer of tiny plants and animals—interlacing threads of mould and fungi, worms, grubs, and creeping insects, tiny root parasites, decaying leaves, and the million of bacteria which spring from them. All these are mixed and mingled together for many inches down below our feet in a confused mass of life. Germs of all sorts swarm in countless millions—indeed all plants that grow and life that exists on the face of the earth owe their being to the fact that the ground is alive. Take a shovelful of the finest soil in the world, and beat it so that all life in it is destroyed, and then plant seeds in it. No amount of care or watering will make those seeds grow. Their life depends on the life in the soil around them."

Mr. Reid thought summer rains did no good, as they destroyed the value of the dry herbage without improving the land. They used to get better crops when the rains did not come until April. Mr. Sires was of a different opinion. He had got two good crops during the past dry seasons, and attributed them largely to the fact that they had summer rains, which, falling on the well-worked fallow land, greatly benefited the succeeding crop. Mr. Willmott thought the paper very much to the point. In districts where the rainfall was heavier and more evenly distributed throughout the year they got better crops. Summer rains stopped water-carting, which pulls the life out of the teams, and consequently when seedtime comes, either less land is put under crop or the work has to be skimmed over because the teams are not in a fit condition to do it thoroughly.

**Johnsburg, April 2.**

Present—Messrs. T. Potter (Chairman), G. H. Dunn, W. James, L. Chalmers, M. L. Read, and W. McRitchie.

**WIRE FENCING.**—Mr. Dunn read the following paper on “The Advantages of keeping Wire Fences Tight, and the Best Way to do it” :—

Having noticed in the March number of the *Journal of Agriculture* an article entitled “A New Idea in Wire Fencing,” and having had a good deal of experience in fencing, I thought that perhaps it would not be out of place if I gave members my experience in connection therewith. In this paper it is not my intention to deal so much with the erection of new fences as the keeping of old fences in repair, and the easiest and cheapest means of doing it.

Now I think all will agree that the best way to keep wire fences in repair is to keep the wires tight, but with a good many this very important matter is much neglected, not so much because the owner of the fence is naturally careless and slovenly in his habits as for the want of a suitable tool for doing this kind of work. With the ordinary run of straining tools there is a good deal of trouble in tightening up an old fence. First of all, when the wire is unfastened at the strainer and bent back, for the purpose of attaching it to the straining tool, it often breaks, which necessitates the splicing in of a new piece of wire before the wire can be tightened, and very often after the wire has been strained it is found that, on account of the post being soft or split, the holding pin will not hold the wire until it is securely fastened. This is a great trouble, and one that makes the straining up of old fences anything but a pleasant job. This was my experience until a few years ago, when I got a very simple little tool from our local blacksmith. Now, instead of mending fences being a trouble, it is more of a pleasure. The little arrangement is so light that I can put it in front of the riding saddle or on the handle bar of the bicycle, and go and strain up miles of fencing in a very short time: no trouble with wires breaking at the straining post, no trouble with soft or split posts. The little thing will work just as well in the middle of a panel as at a post, and it will strain sixty or seventy panels as well as the ordinary kind of strainer will strain thirty or thirty-five panels. I will not attempt to describe the little machine, because there are several in the neighborhood. Members can easily see one for themselves, and, as they only cost a few shillings each, I would advise all those who want to keep their fences tight to get one.

Members considered this strainer one of the best they had seen. It is of a very simple nature, consisting of an iron bar 20in. long, with three small hooks at one end, two on one side and one on the other, and two small jaws to grip the wire, with two short pieces of chain fastened to the ends of it, and a strong anchor chain about 3ft. long to secure round the post. Mr. Potter said he saw an admirable contrivance for straining wires at the Adelaide show. This one gripped and rolled the wires round each other, making a splice that would go through a ½in. hole.

**Calca, April 9.**

Present—Messrs. Jas. Bowman (Chairman), A. Plush, A. Newbold, T. P. Cash, A. B. Smith, and D. P. Thomas (Hon. Sec.).

**BUNT.**—Considerable discussion took place on the subject of clearing bunt from wheat. Mr. Newbold said that in 1894 he had a crop of thirty acres of Steinwedel wheat which was quite one-third bunt. He reaped in hot weather, and, after cleaning, put it through the reaper again to break up the smut balls, which was then blown out. Any seed discolored was put in a heap and sprinkled with newly slaked lime, left all the following day, and winnowed again. This made it quite clean, and the sample fetched top price at Port Adelaide. The Hon. Secretary did not approve of this method, and thought the miller would not have paid top price if he had known of the treatment the wheat got. Breaking the bunt balls spoiled the sample. Other members agreed that the bunt balls should be blown out without breaking, and one member said that by using an oat sieve in the winnower the balls could be removed without breaking.

**CUTTING MALLEE.**—Members were unanimous that in this district mallee mullenised during January and February grows again as well, if not better,

than if mullcnised at any other season. August and September is found to be the best time in this district for this work. The mallee here consists of bastard, red, and white mallee.

**WHEAT EXPERIMENTS.**—Mr. Smith reported that Budd's Rust-resistant wheat promised well, while Dart's Imperial had proved a good variety. He got over 5bush. per acre from this wheat last season. Mr. Plush reported having sown 2lbs. of Gravestock's Frampton wheat and harvested nearly a quarter of a bushel. This was not sown till June.

**WHITE ANTS.**—Mr. Plush reported that vines planted out last year had been completely destroyed by white ants, only the bark being left. Members wished to know whether painting the butt end of the vine, before planting, with grafting wax or other material would prevent attacks. [The termites or "white ants" eat only the dead wood of any tree or plant. The centre or heartwood of the vine or tree being exposed, the insects are enabled to tunnel up the stem. Probably a dressing with pitch or tar on the exposed centre or heartwood might prevent any attack. A mixture of 4ozs. Paris green, 3lbs. sugar, and 12lbs. pollard made into a thick paste will destroy termites. Pieces size of a walnut placed in a hole near the stem, covered with a piece of board to keep the hole dark, will attract the termites.—GEN. SEC.]

### Appila-Yarrowie, April 1.

Present—Messrs. J. H. Bottrall (Chairman), J. C. W. Keller, A. Fox, C. W. H. Hirsch, J. W. F. Hill, J. Daly, J. O'Connell, W. Stacey, P. Lawson, H. Klemm, W. C. Francis, and C. G. F. Bauer (Hon. Sec.).

**NORTHERN CONFERENCE.**—Considerable discussion took place on the action of the Ororoo Branch in again postponing the holding of the annual Conference of Northern Branches, and it was decided to suggest that the Conference be held at Gladstone at an early date.

**CO-OPERATION.**—The Hon. Secretary read extracts from different papers dealing with co-operation, and some discussion followed. Mr. Fox said the Farmers' Co-operative Union should be strongly supported by all farmers, and it would be the worst thing possible to allow the union to be crippled for want of funds.

**SEED EXPERIMENTS.**—Members reported experiments with seeds generally a failure, but Messrs. J. W. F. Hill and J. O'Connell had had good results from Amber Cane and White Kaffir corn respectively. The Hon. Secretary will distribute small quantities of White Kaffir corn to anyone sending a stamped and addressed envelope.

### Gladstone, April 2.

Present—Messrs. J. Tonkin (Chairman), J. H. Rundle, J. Shephard, J. Gallasch, and J. Milne (Hon. Sec.).

**PICKLING SEED WHEAT.**—Mr. Tonkin read the following paper:—

In the early days of farming in South Australia nothing was known about the virtues of bluestone as a preventive of bunt in wheat; consequently the crops were fearfully diseased with that parasitic fungus, and sometimes the farmers had to wash and dry their grain before the millers would purchase it. To prevent bunt many farmers used steepes and pickles of salt, lime, urine, and other substances, with more or less beneficial effect. One of the earliest settlers at Appila-Yarrowie purchased some wheat from myself and sowed it without pickling. He obtained a crop almost free from bunt, but, when he sowed next season from that same crop, he harvested a badly bunted lot of grain. It was evident from this that the bunt had greatly increased through neglect to pickle the second year's lot of seed. The bunt balls each contain many thousands of spores or seeds, any one of which is capable of causing the wheat plant to be diseased with bunt; consequently a single bunt ball could supply enough spores to



infect every grain in a bushel of wheat. Pickling with bluestone (sulphate of copper), 1oz. to each gallon of water, if properly done, will effectually destroy all spores attached to the wheat grains, but might fail to kill those contained in the unbroken bunt balls. Those should be carefully removed from the seed wheat, else they may be broken by the seed-sower or drill and re-infect the pickled seed. The bags in which the pickled seed is to be placed should also be pickled in order to destroy any spores that may be there. Where there is a good hard floor, it is an easy way to throw the seed wheat out, sprinkle it well with the pickle, and turn it with a shovel till the whole is damped. My own method is to procure a large cask or tank, put in sufficient pickle, then, by aid of a jenny wheel or block, lift the bag of seed wheat, immerse it in the pickle for about a minute, until every grain is wetted, then lift it and allow to drain over the tank until another bag is prepared. Then place the pickled wheat with the mouth of each bag lowermost on the dray and carry it on to the field; the pickle then drains back through the grain. To dissolve the bluestone rapidly, place the crystals in a branbag or gunny-bag and immerse in the water close to the surface. If thrown loose into the water it sinks to the bottom, where some of it dissolves and makes the water too dense to dissolve any more; but when placed in the loose bag it dissolves and the solution sinks to the bottom, leaving the surface water comparatively pure, and capable of still rapidly dissolving the bluestone.

Mr. Shephard said he always shot his seed wheat out on the floor, sprinkled the bluestone solution over it, and turned and mixed it with a shovel. He used from a quarter to one-third of a pound of bluestone for each 4bush. of seed. Other members considered dipping in a tank to be an easier method for pickling the grain.

### Mount Remarkable, April 6.

Present—Messrs. H. B. Ewens (Chairman), A. Mitchell, W. Girdham, A. Pope, W. Lange, G. Yates, C. F. Jorgensen, T. P. Yates, and T. H. Casley (Hon. Sec.).

EXHIBIT.—Mr. Lange tabled splendid samples of Imperial tomatoes from Central Bureau seed. He was the only member who had succeeded in growing them, the others having failed owing to the drought.

MANURES.—Mr. T. P. Yates recommended that farmyard manures should be carted out and spread upon the fields before being rotted in a dunghheap. Messrs. Mitchell and Jorgensen contended that manures were of no use on the surrounding plains without rain, and that commercial fertilisers were too dear. The Hon. Secretary recommended members to read the statements and statistics published in the *Journal of Agriculture and Industry* with respect to the use of those fertilisers under the same conditions with respect to rainfall, and they would see reason to alter their opinions.

### Mundoora, April 1.

Present—Messrs. J. Blake (Chairman), W. Atkinson, T. Watt, J. Loveridge, A. McDonald, D. Smith, A. E. Gardiner (Hon. Sec.), and one visitor.

SHEEP.—Referring to a paper read by Mr. Jettner at Alford Conference, on management of sheep, Mr. Loveridge said merino lambs fatten better than Lincolns, and merinos also give more wool at shearing time.

ACUTE INDIGESTION IN Cows.—Mr. J. Blake reported having lost a cow. He had reported the case, with symptoms, to the Chief Inspector of Stock, who kindly replied as follows:—"Your cow is dying from acute indigestion—the effect of the dry season and food. I am afraid it is too far gone to be affected by medicine. You might try injections of warm water with a little soap. She requires tonics, but I am afraid you cannot give them in her present state. You should give your other cows a drench, using 1lb. of treacle in place of carbonate of soda, composed as follows:—Sixteen to 24ozs. of Epsom salts, 2ozs. ground ginger, 2ozs. gentian, 1oz. carbonate of soda (to be omitted in this case and substituted with 1lb. of treacle), 2ozs. sulphur. Mix, and give in from 1qt.

to 2qts. of warm water or thin gruel. Give soft food, green feed, chaff and bran moistened, roots if obtainable, and the following powder every morning for a week with the food, or as a drench, mixed with a quart of gruel or linseed tea :—Carbonate of soda, 4 drams; ground coriander seeds, 2 to 4 drams; powdered gentian root, 2 drams. Licks and tonics may be used, given in troughs or in handfuls mixed with the feed, in the proportion of 10lbs. salt to 11b. sulphate of iron. Quicklime should be placed in the drinking water, more especially if from dams or reservoirs. Pure bone meal should be given in the food, or as a lick, when there is lameness or swollen joints. Sulphur may often be added with advantage to the above mixtures. If feed is very dry, give once daily with bran and chaff, moistened with molasses and water." Messrs. Watt and Atkinson reported having lost heifers in the same way. Mr. Lovelidge had some of his cows similarly affected last year, but upon removing them to another paddock they recovered, although the feed there was no better. All members agreed that if more nutritious and succulent food could be provided very little trouble would be experienced with cattle.

### **Eudunda, April 6.**

Present—Messrs. J. von Bertouch (Chairman), C. Wainwright, E. Schier, A. Pfitzner, A. Kluske, and F. W. Paech.

**MALLEE SHOOT.**—The majority of members are of opinion that the most effective way of killing mallee is to cut the shoots with a blunt instrument during February and July.

**PAPER.**—Mr. J. von Bertouch read a paper upon "Defects of Farming," which was also read at the Kapunda Conference of Lower Northern Branches.

**SEED WHEAT.**—After discussion it was resolved to seek Professor Lowrie's opinion as to which variety of wheat is best suited for this district.

### **Mount Bryan East, March 26.**

Present—Messrs. T. Best (Chairman), R. Webber, T. Wilks, W. Bryce, A. Pohlner, H. W. Collins, H. Wilkins, W. H. Quinn (Hon. Sec.), and three visitors.

**OATEN HAY.**—The Hon. Secretary tabled sample of oaten hay from self-sown crop. His horses did not seem to like the hay, though it appeared to be of fair quality.

**SAND IN HORSES.**—The Hon. Secretary showed a hard lump of sand weighing over 2lbs., which he found in the remains of a horse that had died and had been burned.

**SEED DRILLS.**—A trial of the Superior seed and fertiliser drill was held at Mr. Wilkin's farm in the presence of a number of farmers. About three acres of land were sown by means of the drill, and those present were thoroughly satisfied with the manner in which it performed its work. About 200 acres in all will be put in in this district with the drill during the coming season.

### **Port Pirie, April 5.**

Present—Messrs. E. J. Hector (Chairman), T. Gambrell, J. Lawrie, P. J. Spain, G. Hannan, and G. M. Wright (Hon. Sec.).

**MEMBERSHIP.**—It was decided to send a letter of condolence to the parents of the late Hon. Secretary, Mr. R. M. Bertram, who was a very active and useful member. It was decided to enforce the rule *re* non-attendance.

**Pyap, March 25.**

**Present**—Messrs. G. A. Clarke (Chairman), G. Billett, T. Teale, J. Holt, J. Harrington, T. Smith, E. Robinson, W. Axon, B. T. H. Cox, and W. C. Rodgers (Hon. Sec.).

**EXHIBITS**.—Mr. Teale showed sample of dhurra 10ft. high, with heads weighing 60zs. each. The plot averaged 10ft. The Hon. Secretary showed very large peaches of Lady Palmerston variety. Other business of local importance was dealt with.

**Millicent, April 7.**

**Present**—Messrs R. Campbell (Chairman), S. J. Stuckey, H. Hart, H. Oberlander, A. McRostie, E. J. Harris (Hon. Sec.).

**RAINFALL**.—For March, 0.680in.; to April 7, 1.360in.

**CROPS**.—Members reported the crops generally had yielded more than expected, and some very good yields were obtained. From  $3\frac{1}{2}$  bush. Medea wheat Mr. J. Bird harvested 171 bush.

**STINKWORT**.—Members stated that this weed was making considerable headway at Mount Muirhead and the Snuggery, and that the landowners did not seem to fully appreciate the serious nature of this pest.

**EARLY V. LATE SOWING**.—Generally Mr. Hart favored late sowing in this district, but much depended on the land and the season. Late sowing on early fallow meant freedom from weeds. Mr. Stuckey favored early sowing, but agreed that much depended on the season. He thought that if turnips or rape were sown on land intended for the following wheat crop, and manured, they would have little or no difficulty with the weeds in the wheat. Mr. McRostie said a local farmer had been following out this idea with satisfactory results, but he did not use fertilisers. Mr. Hart said onion seed should be germinated by putting it in a piece of flannel and keeping it damp. This should be done two or three days before the land was prepared for sowing, as the onions would then get a good start of the weeds.

**HOP-GROWING**.—A visitor asked for information concerning the cultivation of hops, which was supplied from the Branch library.

**Lucindale, April 2.**

**Present**—Messrs. E. Feuerherdt (Chairman), B. Feuerherdt, L. McInnes, G. Newman, A. Dow, W. Dow, E. E. Dutton, H. Langberg, A. Matheson, and H. J. Deeble (Hon. Sec.).

**OFFICERS**.—Messrs. E. Feuerherdt and H. J. Deeble were re-elected Chairman and Hon. Secretary respectively for ensuing year, a vote of thanks being accorded to Mr. Feuerherdt for his services during past three years.

**DISEASE OF STOCK**.—Mr. Dutton showed jawbone of a calf that had been attacked by actinomycosis, also skull of calf that had apparently had hydatids on the brain, causing a malformation which prevented its birth. Of the two cows suffering from impaction, one had died and the other was recovering slowly, but was deformed in the hind legs.

**MANURING**.—Mr. Dow reported that wheat and Algerian oats manured with 2cwts. bonedust per acre yielded twice as well as unmanured crops.

**CROWS**.—Members disagreed with the Chairman of the Central Bureau's opinion as to the usefulness of crows, especially in grazing districts.

**HYDATIDS IN STOCK**.—The Chairman read the following paper on this subject:—

Hydatid disease is now very frequently found in cattle, sheep, and swine in the South-East district, more deaths occurring amongst the stock from this cause than is generally known,

and the prevention of the spread of the disease is a matter which imperatively calls for the attention of all, the danger to human beings being as great as to all stock. The disease is caused by the development in the body of the embryo of the tape-worm, of which the dog is the common host and distributing agent. To understand how great the danger of infection is it is necessary to know a little of the life history of the tape-worm, and I will endeavor to give a brief outline of the life history of the varieties most common. The species most common to the dog is the *Tænia caninus*, which varies in length from 20in. to 60in., and is made up of the head or parent worm and numerous joints. When first the head or parent worm gets into its host (the dog) it is very small, and has no joints, but these soon begin to appear, and gradually increase in size and in numbers. Each joint is developed just below the head, and is in itself a perfect animal, and being bi-sexual each segment or joint develops what are known as eggs, but which are rather young embryo in a protective shell. These eggs are continually passed off, and are voided by the host, and being very minute are soon spread over the ground by the action of the wind, flood waters, &c. The segments are also continually being passed off and voided by the host, and as each segment is pregnant with these eggs ready to be released, these are also distributed broadcast. It is stated that segments of tape-worm that have been exposed to the air and sun a considerable time still retain vitality in their eggs or embryos. The eggs gain admission into the system of the animal by being taken up with the feed or water. Being very minute they enter into blood circulation, are carried to the various organs or parts of the body, and when lodged commence further developments. The eggs enlarge, and form cysts or bladders, called hydatids, filled with a clear fluid in which the embryo floats about. These hydatid cysts vary in size from the size of a pea upwards. The embryo rapidly develops by a process of internal budding, and throws off numerous small objects endowed with life, and their rapid development requiring more space the bladder grows larger, and by such growth destroys or causes to be absorbed the substance of the organ or the part of the body in which they are lodged. After a time these embryos, which are now provided with suckers and hooks, appear on the outside of the cyst, and are now, as far as the animal harboring the hydatid is concerned, fully formed, and wait only to gain egress from their birthplace in order to assume a mature development and propagate their species. To effect this they must gain access to the stomach of the dog, and this may be accomplished in a variety of ways. In the case of a sheep being diseased and poor it is probably slaughtered for dog feed, and the development is accomplished, and one or more arriving in the intestines attain maturity and become the tapeworm. The variety known as the *Echino-coccus*, when fully developed in the dog, does not attain a greater length than 3in., and on this account is the most dangerous, as its presence is very rarely noticed. When the ovum or eggs of this species are transferred to human beings or other animals, in which it passes its larval or hydatid stage, it assumes a size many thousand times greater than the capacity of its adult condition. In the human system it produces most fatal results, and in a less degree in cattle, sheep, and pigs. This variety from a single egg, in the hydatid form in the system, will develop thousands of the embryo tapeworm, and during their development, while embedded in some organ of the body, they create such disorganisation as to destroy life. Large masses of these hydatid formations, weighing many pounds, have been taken from human subjects of late years. They are frequently found attached to the viscera of sheep, even when the sheep is fat, and as the viscera is generally thrown to the dogs, the circle of its life is again completed. To the dog the tapeworm seems perfectly harmless. Professor Esricht, of Copenhagen, found a tapeworm of over 1,000 joints, and in some of these joints as many as 1,000 eggs. As sheep graze closely they most commonly take up the ova, and in some countries a large percentage of deaths occur from hydatid attacks. The most common victims are lambs and young sheep. In Great Britain the annual losses are stated at 10 per cent. from this cause. Cases are quoted of sheepfarmers in Great Britain who keep no dogs losing no sheep from hydatid disease. In pigs the disease shows itself in the flesh, and pigs are said to be measly, and become unfit for food. Sheep and cattle when seriously affected rapidly lose condition; perhaps linger until the cold weather sets in, and then die. As there is no cure once an animal is affected, it behooves all to adopt preventative measures. All dogs should be periodically physicked to expel the worms, and the voidings should be burned. The physic mostly used for this purpose is a dose of areca nut, freshly ground, as much as will lie on a sixpence, or a dose of santonin. The areca nut is very effective, but must be used when freshly ground. The dog should be kept without food for twelve hours previous to receiving the dose, which is to be followed in half an hour by some warm broth, and kept chained up so that the voidings can be collected and burnt.

### Bute, April 5.

Present—Messrs. A. Schroeter (Chairman), H. Schroeter, R. C. Commons, J. J. Chapman, J. H. Barnes, W. H. Sharman, J. J. Birch, W. Sluggett, W. Langsford, M. Stevens, M. Hall, and D. Green (Hon. Sec.).

**FIELD TRIAL SOCIETY.**—Mr. Sharman reported on meeting of the Bureau Field Trial Society, which he stated was in a good financial condition. The next trial will be held in August, near Bute. A committee was appointed to inspect land offered for the trial.

**SEASON.**—Rainfall for April to date, 0.950in. Members reported failure with seeds last season owing to drought.

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### Redhill, April 5.

**Present**—Messrs. A. A. Robertson (Chairman), H. Darwin, D. Lithgow D. Steele, R. Siviour, T. McDonald (Hon. Sec.), and two visitors.

**SEEDING.**—An interesting discussion took place on "What Wheat to Sow, and When to Sow." Mr. Lithgow considered it a mistake to sow early-maturing wheats like Steinwedel and Bearded early in the season, as if dry weather comes on they run up without stooling. He had good results from sowing these varieties about the middle of May, while his neighbors' early-sown crops of these wheats failed. Moderately slow growers, like Scotch Wonder, Purple Straw, and Fillbag, should be sown early. Mr. Steele also favored these wheats, but considered individual judgment necessary to decide when to sow. Members generally considered that the best time to sow wheat in this district is from the middle of April to middle of May, the late-maturing wheats being sown first.

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### Cherry Gardens, April 12.

**Present**—Messrs. E. Wright (Chairman), T. Jacobs, C. Lewis, J. Lewis, J. Choate, J. Nicholls, G. Brumby, G. Hicks, R. Gibbins, C. Ricks (Hon. Sec.), and one visitor.

**CODLIN MOTH.**—Mr. Jacobs tabled apple attacked by codlin moth caterpillar. Members reported that they were doing all in their power to cope with this pest by bandaging the trees and destroying infested fruit.

**CONFERENCE AND SHOW.**—Mr. Gibbins reported on the Conference of Southern Branches held at Strathalbyn on March 31. It was decided to support the other Branches in their request that delegates from different Bureaus should be given free passes over the railway to attend such meetings, as the members give their services free for the benefit of the country generally. Considerable business in connection with the late show was transacted.

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### Naracoorte, April 16.

**Present**—Messrs. O. Hunt (Chairman), H. Smith, D. McInnes, S. Schinckel, J. Wynes, J. D. Smith, D. Findlater, R. N. Paris (Hon. Sec.), and one visitor.

**CODLIN MOTH.**—The Hon. Secretary stated that he had written to the local inspector, calling his attention to the spread of this pest in the district, and to the fact that no active steps had been taken to cope with it, but had received no reply. It was decided to ask the Central Bureau to move in the matter.

**ROTATION OF CROPS.**—Mr. Wynes read a short paper on this subject. He considered it would be much better if the farmers would put in a greater variety of crops, and not rely on one or two. In no case should the land be under the same kind of crop for more than two years in succession. If the farmers had more kinds of produce to depend on, they would not be so affected by low prices for one or two lines as at present. Members generally were of opinion that it was best to sow different crops each year.

**HORSES EATING WHEAT**—The Chairman said the following remedy, which had been proved very efficacious in saving horses which had been eating wheat, was published in the *Leader* of March 12. Give one tablespoonful of carbonate of soda in a pint and a half of water directly the discovery is made. Allow the animal food and water, especially the latter, and if there is any stiffness of the limbs rub well with turps until the animal gets restless.

**PRUNING FRUIT TREES**—The Chairman read the following article from the *Leader* on "Developing and Maintaining the Foliage of Fruit Trees":—

"How can I prevent the bareness of foliage so common in many orchards?" asks a correspondent. "In my case all the foliage to be seen is about two or three years' growth, right at the top of the tree. My young trees are four years old, and this year, to my sorrow, they are going the same way as the others, and what I want, of course, is to see the leaves covering the branches." As to the best system of pruning, which will develop and maintain foliage and fruit wood on the lower portions of fruit trees, our correspondent is informed that his trees are bare because they have been allowed too much young wood to stand during the first two or three years. The prime necessity is a broad, robust base, and to obtain this no wood should be left so long that it will preserve blind eyes. Hard pruning during the first two or three years will develop all the eyes, but if a great length of wood is left only the topmost eyes will send out shoots, and as a consequence the branches will remain bare below, for once allow a hood to form over bare rods there is the narrowest chance of these producing either lateral branches or fruit spurs.

Mr C. B. Luffman, the principal of the Horticultural School at Burnley, on this point says—If fruitgrowers were not so anxious to obtain size in their young trees the business might often be more profitable. Look at the development of a tree in this way. Admit that 3ft. of fairly robust headgrowth is possible in four years. Ordinary way of obtaining it—9in. of young wood each year. Result, topmost foot of the tree fruitful, lower 2ft. permanently bare. A more rational system. First pruning to two or three eyes, and removal of every particle of weak wood. Second pruning to within two or three eyes of previous season's growth (again removing every bit of weak wood, as strong branches are only possible from a strong source). Third pruning, about 6in. of young wood may be left, at the same time shorten all lateral twigs, so as to convert them into spurs. Fourth pruning may vary from 9in. to 1ft., according to strength and disposition of tree. Here the total is but little more than 2ft., but the diameter is much greater than the 3ft. specimen. All is fruitful, and we have the foundation of a tree which never need become bare and profitless in its lower limbs. To develop useful wood on the lower portions of the trees cut back into the two and three year old wood. In the following spring, if the leading shoots endeavor to run away with the growth, pinch them back or remove altogether, for so long as these exist to absorb all the sap the lower buds will have no inclination to push out. When all the wood is plentifully supplied with spurs, allow the head to expand slowly, outwards and upwards, in order to render it fruitful.

The Chairman said this bore out what he said on the same subject in a paper read by himself some time ago. He had inspected the trees in Mr Smith's garden, which were pruned on this season, and a better shaped or more even lot of apple trees could not be desired. (The members adjourned to inspect Mr Smith's orchard, which contains over 400 apple trees and as many more mixed fruits, all of which were in splendid condition.) Mr Smith stated that his trees had been pruned hard, on the advice of their Chairman, and he was thoroughly satisfied with the result. Members were also satisfied, as the trees in many cases were loaded with fruit and foliage almost to the ground, and perfectly free from disease. Most of the trees have been planted since 1890, but those put in in 1888 are bearing well. The vines are also doing well.

**EXHIBITS**—Mr J. D. Smith tabled samples of red and white Kaffir corn, dhurra, lucern, and sorghum grown by himself.

**UTILISATION OF SALT SWAMPS.**—Mr. Findlater said there was a considerable area of swampy land on which the tea-tree grows very large and strong, and he wondered whether there was not something else that could be grown in place of them that would yield some return. The Chairman said these swamps, if drained, would do well for mangolds. [Why not osiers?—GEN. SEC.]. In reply to questions Mr Findlater stated that at Narrung station, the owner, by the application of salt to the soil each year, could keep two more sheep to the acre than he used to be able to.

**Dawson, March 26.**

Present—Messrs. R. Renton (Chairman), C. W. Dowden, S. Chapman, A. J. Hooper, C. F. W. Just, C. Stoneman, A. H. Warner, Rev. T. Wetherall, A. F. Dempsey (Hon. Sec.), and eight visitors.

**FEEDING AND GROOMING HORSES.**—Mr. Chapman read a paper on this subject, of which the following is the substance :—

In reading a paper on this subject I hope to create some interest in the matter, and learn something that will be of use to myself. The great value of the Bureau work is in this exchange of opinions, and the stimulation of a desire to learn more than we know at present of the different matters affecting our well-being.

**Feeding Horses.**—In this matter I will speak more especially of our own district. I feed my horses as little as possible, having sufficient run for them to pick up almost all the food they require in ordinary seasons. I consider it better to keep a few more horses, and spell them oftener in the working season, than to only have sufficient to do the work and stable feed them to keep their strength up. Usually, when working, my horses get feed only at dinner-time, when they are allowed to feed on a heap of hay near the wheat heap. If the animals are taken back to the homestead for feed and water at dinner-time there is considerable loss of time in the best part of the day for reaping or threshing, and very often the time that is lost here is responsible for delay and consequent loss of grain from rough weather. When I first settled here, I fenced the farm in small paddocks, and though this meant considerable time and expense I am quite satisfied that it paid me. With small paddocks one or more of the best can always be reserved for the working stock and milk cows, while the idlers will pick up all they require after them. Besides this, small paddocks increase the carrying capacity of the farm. If the stock ramble over a large area they trample down and waste a lot of food, pick out the best and leave the poorer quality. The consequence is that gradually the feed deteriorates, owing to the poorer plants only being allowed to seed. If you have small paddocks you can leave one each year to go to seed before you stock it, and in this way get the poorer grasses eaten with the richer, and allow the latter a chance of spreading from the reserved paddock. If this were carried out on all farms we would not have to complain of the lack of nutritious feed. Unfortunately, however, all farmers do not possess sufficient land to depend entirely upon this method; hence hand feeding is necessary. Here a great deal must be left to individual judgment, as it is useless attempting to feed all horses alike. To keep them in health each must be studied and treated accordingly. At my old home at Snowtown we used to feed, when working, with boiled wheat, to which a little bran and wheat chaff had been added, at breakfast and dinner; and at night allow them as much hay as they would clean up. By this method the teams were capable of working long hours, and often the drivers would be ready to give in first.

**Grooming the Horse.**—This operation is sadly neglected by the average owner of horses. How refreshing it is when we come home hot and tired to get a good wash. If we would only think we would see too that a good rubbing down with currycomb or coarse brush after the sweat has dried has a similar effect on the horse. Let him go free, and the first thing he does, if in health, is to have a good roll and shake, his natural way of cleaning himself. Much labor is spent by some in doing for the horse what he can do better for himself, and I think the best way is to let him clean himself by rolling and rubbing himself where he can, and attending to the parts he cannot get at, such as the shoulders, inside the legs, the girth, the flanks, and along the back. Then the hollows below the ears require attention. Sometimes in young horses this part gets very tender, causing tossing and rubbing of the head when working—a very bad habit in a team. I find that a vigorous rubbing with the hands for a short time before putting on the blinkers or bridle has a very beneficial effect, and in a short time they become quiet. I strongly believe in a clean skin as a preserver of health.

Considerable discussion ensued. The idea of small paddocks for conserving feed was highly approved of, but the practice of keeping extra stock on small holdings with limited carrying capacity strongly condemned. On the question of boiled *versus* crushed wheat members were about equally divided, while Mr. Wetherall recommended crushed oats in preference to wheat in any form. The majority favored watering the horse after feeding as being safer than before feeding. The question of grooming was not considered of much importance here, as the horses generally have their freedom, being rarely stabled. Members generally favored the brush in preference to the comb when grooming.

**SEED DRILLS.**—Considerable interest has been manifested in the working of the seed and fertiliser drill, of which the Branch has obtained a loan, and several public trials have been given, the farmers taking great interest in this

matter. Applications for use of the drill, covering an area of about 300 acres, have been approved, and as the result of trials several alterations have been suggested in the manufacture of the drill to suit a district like this.

### Swan Reach, April 7.

Present—Messrs. P. A. Hasse (Chairman), J. O. J. Kohnke, J. L. Baker, A. Fischer, F. F. Brecht, P. A. Beck (Hon. Sec.), and three visitors.

**ANNUAL REPORT.**—The Hon. Secretary read his report on the work of the Branch since its inauguration in April last. Ten meetings had been held, with an average attendance of eight members. Some members were very lax in this matter, but he hoped they would do better. The meetings were only once a month, and the few hours' time required was not lost, as the benefits obtainable from their meetings more than compensated for any apparent loss. He also asked the members to use their influence in getting their friends to attend, as the more interest taken in the Branch the more good likely to result. He hoped the members would carry out experiments with seeds received from the Central Bureau, as only such seeds as had proved of value elsewhere were imported. All of the seed should not be sown at one time, as by making two or more sowings there was more chance of success. The subject of co-operation had come in for considerable attention, and it was decided to support the South Australian Farmers' Co-operative Union. Stock have been pretty free from disease during the year, though some losses have resulted from the drought. The district was remarkably free of noxious weeds and insect pests, and he hoped members would do their best, and get their neighbors to do the same, to prevent the introduction of such pests. Messrs. P. A. Hasse and P. A. Beck were re-elected chairman and hon. secretary for ensuing year.

**BRANCH SHOW.**—The proposal of the Bowhill Branch that a united show of products in connection with the Branches on the Murray shall be held in August met with much favor, and it was decided to leave the location of show to the Bowhill Branch to settle. Each member promised to do his best to make the show a success in the event of the same being held.

### Maitland, April 2.

Present—Messrs. C. F. G. Heinrich (Chairman), J. W. Shannon, W. Wilson, H. R. Wundersitz, H. Bawden, A. Jarrett, and C. W. Wood (Hon. Sec.).

**BUNT.**—Considerable discussion took place on smut or bunt in wheat. Most of the members were of opinion that when the seed is sown and harrowed in in damp muggy weather the crop is more likely to be bunted than if the seed is harrowed in in either wet or dry weather.

**MANURES.**—Attention was called to the difficulty in obtaining from some agents analyses of the fertilisers they sell. In one instance an analysis was demanded, but the agent simply stated that the super-guano sold by him was Kangaroo Island guano, with 5 per cent. of nitrate of soda, which the purchasers considered unsatisfactory. Members were of opinion that this answer did not comply with the Fertilisers Act [The Act states that the seller of any fertiliser which is subjected to any artificial process *must* give to the buyer an analysis of the article, and any seller who neglects to do this, whether the analysis is asked for by the purchaser or not, is liable to a fine of not more than £20. Super-guano is guano treated with sulphuric acid, and to which a percentage of nitrate of soda is added, and is therefore a manufactured



fertiliser. Purchasers should in every case demand an analysis with the fertiliser, and decline to accept the fertiliser unless their demand is complied with. — GEN. SEC.]

**WOOD ASHES AS A FERTILISER.**—In reply to question *re* utility of drilling in wood ashes with the seed, members generally were of opinion that sufficient could not be put in with the drill to be of any practical benefit. The Hon. Sec. put on as much fresh wood ashes as the drill was capable of distributing—about 4cwts. per acre—but could see no result. It was decided that 80lbs. to 100lbs. super and not less than 40lbs. wheat per acre should be put in in this district.

### Inkerman, April 7.

Present—Messrs. S. Diprose (Chairman), Thos. Forrest, J. Sampson, D. J. Strongman, E. M. Hewett, S. Wills, D. Fraser, and W. A. Hewett (Hon. Sec.).

**CEREAL EXPERIMENTS.**—Two members promised to sow wheats received from Central Bureau, report results, and return the produce to the Branch for distribution next season. Another member promised to act similarly with oat seed. Mr. Strongman advised members to select the best heads in the crops and sow the seeds from this for the purpose of improving the standard. It had been stated that from one grain 13,000 grains were obtained in one season, this astonishing result being obtained by taking up the plant as soon as it began to stool, dividing, and replanting. Each plant was similarly treated when it began to stool, with the result as stated.

**FEED FOR STOCK.**—Mr. Board stated that he was feeding copra cake to his cows in the hope of supplying the qualities lacking in the natural feed, and so averting further loss from the complaint which has been so fatal to stock in this district. Mr. Strongman said he had seen most satisfactory results from mixing a little bonemeal with the food of cows.

### Strathalbyn, April 18.

Present—Messrs. M. Rankine (Chairman), E. R. Morgan, R. Watt, H. H. Butler, G. Sissons, and W. M. Rankine.

**BINDER AND HEADER.**—Considerable discussion took place on Mr. Morgan's paper, read at previous meeting, on this subject. Several members were of opinion that the header was not intended to replace the stripper, but was a convenience to enable them to obtain sufficient straw for their requirements. The Chairman was of opinion that Mr. Morgan's estimate of loss of grain when using the binder was over-estimated. At any rate, with ordinary care it should be much less. Mr. Morgan, in reply, referred to the remarks of the General Secretary on his paper. If that gentleman thought they could cut their crops with the binder much sooner than they could strip them, he differed from him. He had tried it himself, and would not do it again. The General Secretary was not in a position to estimate the loss, as he had no knowledge of the state of the crop and local conditions of weather, &c. On the twenty-eight acres cut with the binder twenty pigs had been fattened after the sheaves had been carted, and there is now a thick self-sown crop springing up, and enough barley left to fatten a good many poor pigs. In regard to the weight of the sheaves, he counted two or three loads, averaged them, and estimated the number according to the number of loads taken off the field. He allowed for the grain that was left in the sheaves, but it was not an immediately negotiable asset. Being in

the straw, it can only be got back in an indirect way—by feeding or other means. If a large area were cut with the binder and headed there would be a large immediate loss, and some hundreds of tons of straw of some value; but he would like to know what a farmer would do with this straw, say he cut 400 to 500 tons from 250 acres. [I admit, of course, that it is impossible for anyone but those who saw the crop to say what the loss of grain, weight of sheaves, etc., should be, but on these points I claim that the figures given by Mr. Morgan would not be borne out by the average of results obtained by using the binder and disc-header, and therefore I called attention to where, in my opinion, such figures were at fault, and asked those members who had treated their crops in this way to give their opinions, based on their individual experiences. Contrast Mr. Morgan's experience with that of Mr. J. King, of Gladstone Branch, who harvested over 100 tons of sheaves with the binder last season, and states he started from a week to a fortnight earlier than with the stripper, that there was scarcely any wheat on the ground where the binder had been, but up to a bushel or more per acre shed and wasted on the portion harvested by means of the stripper, and that with careful handling he removed the 100 tons of sheaves with a loss of only about 2 bush. of grain shaken out. It is not claimed that the stripper should be replaced by the binder and disc-header, but that sufficient of the crop should be harvested in this way to give the farmer a good stock of straw of much higher feeding value than straw from which the grain has been stripped. In South Australia, at any rate, unless conditions alter to an unexpected extent, the stripper will always occupy the premier place in harvesting operations.—GEN. SEC.]

MANURES. — Mr. W. M. Rankine read a paper on "Chemical Fertilisers."

### Clarendon, April 14.

Present—Messrs. A. Harper (Chairman), J. Wright, J. Chapman, J. Juers, J. Piggott, and A. L. Morphet (Hon. Sec.).

CONFERENCE.—The Chairman reported on proceedings of Southern Conference held at Strathalbyn on March 31. He considered it only fair that the department should provide railway passes for members attending such meetings.

### Orroroo, April 9.

Present—Messrs. J. Moody (Chairman), S. Roberts, A. Zanker, W. S. Lillecrapp, E. D. Kirkland, G. Matthews, and T. H. P. Tapscott (Hon. Sec.).

POISONING SPARROWS.—In reply to question, Mr. Zanker said he found that by mixing poisoned wheat with old chaff or other rubbish the sparrows pick it up more readily than if wheat only is scattered about.

PAPER.—Mr. Matthews read a paper on "Should the State make Mechanics?" He strongly supported the Agricultural College as a means of instructing farmers in the more advanced methods of utilising the land; but in reading the college reports he could not help noticing how the management attempt to do mechanical work on the farm, and engage skilled labor to endeavor to teach the students something the college was never intended for. He did not consider that a pupil studying agriculture had any time to spare to learn mechanical trades with any advantage to himself. Not that he thought a farmer should not be able to effect temporary repairs, because the very nature of his work demanded such ability, but they could carry such a thing too far, to the injury of the men who devote years of work to make themselves proficient in their business. He then referred to the work of the School of Mines, which he also considered was going beyond the legitimate scope of such an institution.

To summarise his objections to the State manufacture of mechanics—It is unfair to the main body of workers while competition is so keen among workmen; it is also unfair to the student on account of insufficient practice, unless he purpose to make some trade his life work; it is also unfair to the tradesman in teaching his customer the simpler branches, leaving to the trained worker the less profitable but more difficult work; it is an unfair tax on the schoolmaster to expect him to teach the use of tools in manual work.

### Boothby, April 12.

Present—Messrs. J. T. Whyte (Chairman), T. Sims, F. Mills, E. Bradley, T. Robinson, R. Chaplin, J. Bell, and R. M. B. Whyte (Hon. Sec.).

**WATER CONSERVATION.**—Mr. Sims read a paper on "A Water Scheme for the District." He said that during the past two or three years the farmers in the district had been carting water for the greater part of both summer and winter from distances varying from six to ten miles. As there were never-failing supplies of water at different reserves in the hills at their back, from seven to ten miles distant, and several hundred feet above the level of the district to be served, he thought there would be no difficulty in conveying the water by means of pipes at very cheap rates to any part of the district. It was decided to ask the Conservator of Water to furnish an estimate of the cost of bringing the water from the hills as suggested by Mr. Sims.

**PLOUGH AXLES.**—Some discussion took place on the different makes of axles for ploughs. The members appeared to favor a straight or even axle in preference to a tapered one for ploughs.

### Angaston, April 23.

Present—Messrs. R. Player (Chairman), E. Thumm, W. Sage, W. Sibley, P. Radford, S. O. Smith, J. Vaughan, A. Friend, F. Thorne, A. Sibley, and E. S. Matthews (Hon. Sec.).

**CONFERENCE.**—Mr. Smith gave a very full report of proceedings of Conference of Branches held at Kapunda on April 6.

**FIELD TRIAL.**—The Chairman invited the members to attend field trial of new seed drill to be held on his farm on April 25.

**LUCERN.**—Mr. Vaughan read a paper on this subject, in which he strongly recommended the cultivation of lucern on suitable soils, of which there was a fair area in this district. If stock had a little green lucern daily there would not be so much trouble from impaction, indigestion, and other similar complaints. A lucern plot was also of great value where poultry are kept. In preparing the land for sowing, plough well, then harrow and roll, and again harrow and roll, to get the soil as fine as possible. Then sow seed [about 8lbs. to 12lbs. of drilled, 14lbs. to 20lbs. of broadcasted.—GEN. SEC.], and cover by drawing across the field a few bags, attached to a long swing bar, and containing a few shovelfuls of earth. Not much return can be expected for the first few years, but then, for a long period, it should yield heavily. In July of each year put on a good dressing of manure, harrow the field both ways with sharp-tined and weighted harrows, sow a few oats, and harrow again. This will give a nice cut about September, which can be made into stack ensilage if desired, by allowing it to get nearly half dry, stacking, and covering with a few logs. Other green stuff can be similarly cured, and will be much appreciated by stock. Lucern, being a very deep rooting plant, will withstand great heat, and with irrigation can be cut every few weeks in the summer, producing large quantities of fodder of the greatest value. An interesting discussion followed the reading of this paper.

## Minlaton, April 23.

Present—Messrs. J. Anderson (in chair), M. Twartz, W. Correll, J. Fletcher, R. Higgins, A. McKenzie, D. G. Teichelmann, H. Boundy, S. Vanstone, and J. Correll (Hon. Sec.).

FRUIT-GROWING.—The Hon. Secretary read a paper on "Farmers and Fruit Culture," as follows:—

My object in writing this paper is not to attempt to enlighten those who are professional fruitgrowers or farmers who have been successful in growing fruit—from these I am a seeker of information; but to try to show those who have not been successful in growing fruit for home use that it is possible in the majority of instances to do so.

I think it will be admitted by all that there is no more wholesome food than good fruit, and if I can give in this paper any hint which will assist anyone to a nice fruit garden I shall feel amply repaid for my trouble in preparing it.

In starting an orchard or vineyard one of the most important things to be considered is the soil, subsoil, and situation. It is not at all advisable to plant a garden in a hollow or in low-lying spots, chiefly on account of frost and stagnant waters in excessively wet seasons; neither is it good to plant on the top of hills, chiefly because of winds and frost. Plant on the side of hills or uplands having a northern or eastern aspect in this district, as in such a position the frost is never so severe, and the hill will somewhat protect it from the prevailing south-westerly winds. As to selection of soil, too little care is often taken, or the wrong class of soil is chosen; hence failures occur. On the Peninsula, as far as I can see, it is unwise to select a heavy clay patch, or where stiff clay is found less than say 14in. from the surface. A deep red sandy loam is one of the best soils to select; failing this the dark or chocolate patches will grow excellent fruit trees and vines, or the lighter soils which have a rotten calcareous subsoil with stiff clay within 2ft. or 3ft. In the latter class of soil vines do exceedingly well; also fig trees, and almonds, and peaches grafted on almond stocks. Vines will grow on even the poor rubbly patches which produce but poor crops of cereals; the fruit is good for raisins, being very solid. Having selected a site for an orchard the next thing is to prepare it for planting, which consists of surface ploughing, followed by subsoiling. This can be easily and cheaply done by using two single ploughs, one without its mouldboard following in the wake of the other, or by ploughing first with an ordinary S.J. plough; then by removing the mouldboards, the subsoil can be stirred from 9in. to 12in. deep. This work would be better done as long before the trees or vines are planted as convenient, to allow moisture to accumulate and the soil to mellow. When the land is prepared it should be laid out on a systematic plan; first wind-breaks could with advantage be planted; these might consist of quickly-growing hedges of boxthorn, tamarisk, tree lucern, bamboos, &c. Some hardy fruit trees, such as olives, carobs, almonds, &c., might well be planted around inside the wind-break, making a second line of defence. Trees and vines are usually planted much too closely together in farm gardens—a fatal mistake. Surely ground is cheap enough. I have often seen half a dozen fruit trees together with a few vines and vegetables, and perhaps a few gum trees, planted on a piece of ground only large enough to grow three or four fruit trees well. The best distance apart to plant fruit trees in our poor and dry calcareous soil is 25ft., never less than 20ft.; for some trees as much as 30ft. would be better. For vines I think 10ft. about the best width apart.

When the ground is properly prepared the holes ought to be all dug ready *before* beginning to plant. These should be dug out say, 18in. square and 8in. or 10in. deep, then the bottom soil loosened up well with a digging-fork or crowbar, and left in the hole. One thing should certainly not be done, i.e., throw out the subsoil and replace a lot of stable manure and humus. Such is often done. The holes for vines should be dug in the same manner, but need not be as large as those for fruit trees. When planting both trees and vines (especially vines) in poor soil it is a good thing to put in about an egg-cup full or so of Thomas phosphate powder, or some good bonedust, putting half of it in first and mixing it with the subsoil; then put your tree in the hole, keeping it upright and about as deep as it was in the nursery; spread the roots out, carefully putting some of the best soil on the roots; also sprinkle in the rest of the phosphate. Just before filling in the last of the soil tramp the ground down firmly, leaving the surface loose. When all your trees are planted they should be pruned hard back; the crown should not be too high from the surface, say 18in. or not more than 2ft.; three shoots only should be left, and care should be taken to cut the shoots left so that the top buds will be pointing outwards. Young vines should be cut back to two or three buds.

I am not at all sure that it is a good thing to put a mulch round young trees, as it encourages the roots to form too near the surface and also harbors destructive insects. I prefer to keep the whole surface loose. Immediately after a shower in the hot weather the young trees or vines ought to be hoed round to loosen the surface, preventing evaporation. The young trees will require to be protected from hares, and also examined for scale on pears, apples, and quinces, and shothole fungus, curl leaf, or aphid on peaches and apricots, and red spiders on

plum trees. If any of these are found the trees should be sprayed with the proper mixture—a reference to the pamphlet on spraying, issued by the Agricultural Bureau, will give information on this point. If the various mixtures are properly made and applied they will get rid of the pests.

No vegetables, melons, wheat, oats, barley, or weeds should be allowed to grow in an orchard.

Considerable discussion ensued, and the merits of subsoiling came in for some attention. Mr. McKenzie stated that he was replanting his orchard on higher ground, as he had had his vines cut several times by frost since he planted it on the lower position. Members generally agreed that low-lying land should not be planted with vines.

### Robertstown, March 20.

Present—Messrs. N. Westphalen (Chairman), G. Dalatz, A. Day, T. Hagley, S. Carter (Hon. Sec.), and one visitor.

CONFERENCE.—The Chairman reported on proceedings of Kapunda Conference of Branches.

STREAKY BUTTER.—Considerable discussion took place on the cause of streakiness in butter, but no satisfactory explanation was forthcoming.

### Dawson, April 23.

Present—Messrs. R. Renton (Chairman), C. W. Dowden, C. F. W. Just, C. H. Meyers, C. C. Kyd, and A. F. Dempsey (Hon. Sec.).

SEED DRILL.—The Hon. Secretary reported that 270 acres around Dawson had been put under crop by means of the seed and fertiliser drill loaned to the Branch. The drill was now at work in the eastern portion of the district, where a fair area was to be sown by different farmers. Other business of local importance was transacted.

## MUNICIPAL MANAGEMENT OF MUNICIPAL MATTERS.

In many of the old-established cities and large towns of Europe and America the municipal authorities have become more and more impressed with the necessity for retaining in their own hands and exercising the fullest control over their streets, traffic, and public institutions, and undertaking, in the interests of the burgesses, certain powers and privileges previously enjoyed by private contractors and public companies. In many cases the paths and roadways had for long been controlled by practically irresponsible individuals and associations, and the citizens had been put to so much inconvenience that the municipal corporations were compelled to take the initiative, and in many cities and towns they now entirely control the tramways, electric and gas lighting, water supply, telephones, and similar institutions which intimately affect traffic or disfigure the appearance of the streets. The assumption of this control by the municipal authorities has contributed greatly to the profit and advantage of the citizens, and has vastly increased the convenience of vehicular traffic within their boundaries. A few of the continental civic councils control the traffic in alcoholic liquors and tobacco, and most of the municipalities of Europe and America manage the scavenging and sewerage

of their towns, whilst many of them derive considerable revenue from utilisation of the waste thus dealt with. Lately, by aid of furnaces specially designed, some of the advanced municipalities have been enabled to electrically light their streets by the combustion of the city refuse. Public baths, lavatories, abattoirs, libraries and reading rooms, gymnasiums, museums, art galleries, and numerous educational institutions are owned by various British and other municipal corporations, and not a few of them manage their own workshops for the manufacture and production of implements and material required for the service of their citizens. Time was, and not very long ago, when not even the smallest job could be undertaken by a city council without raising a protest from some would-be contractors, who seemed to feel that they were being defrauded of their rightful "pickings" wherever the public money was being expended. But the taxpayers themselves were finally appealed to, and when they saw the advantages to be derived from the carrying out by the municipal officers of all work connected with the municipalities they quickly decided in favor of their own officers and machinery.

A late issue of the London *Daily Chronicle* dealt with some new works connected with the Battersea municipal workshops, new baths, libraries, and crèche, remarking as a preliminary that not long since "the parish of Battersea was bound hand and foot to the contractor, when not even the smallest job could be carried out without the intervention of that gentleman." Since then the council has become independent of outside control, and has greatly improved the position of their employes, and extended the principle of direct employment to the utmost possible extent. Their surveyor has an army of employes, numbering between 700 and 800 men, which last year, in addition to the ordinary cleansing and repairing works of the parish, carried out local improvements which cost nearly £28,000, all of which in the "good old times" would have gone to the contractor. The council has just completed a number of workshops which will compare for completeness and efficiency of outfit with any in the city. They have a plain but substantial elevation of two stories, having plenty of light and ventilation. The principal block is 280ft. by 25ft., and in it are comprised workshops for carpenters, wheelwrights, vanbuilders, plumbers, shoe and other smiths, engineers, cabinetmakers, painters, masons, and other necessary trades. A printing office was included in the original scheme, but has been put by for a time. A gas-engine of twenty-five horsepower and a smaller one have been set up. There is also a large painting shed, and a commodious mess-room for the men, stabling, harness-room, and a general office in a separate building.

But many other works are projected, and amongst them sites have been secured and plans prepared for electric lighting of the municipality, for new baths and washhouses, a new reading-room in connection with the three already existing, public libraries, and a municipal crèche where babies may be left by mothers anxious to do their weekly wash in peace. The cost of the swimming bath 150ft. long, a number of private baths, washhouse accommodation for about sixty customers, the new reading-room, and the crèche will be about £25,000, and £5,000 has been paid for the site. This is rather a large undertaking for the works department in starting its new career.



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### NOTES AND COMMENTS.

The prospects of the season have greatly improved during the past month. The early part of May was cold, dry, and frosty; but on the 15th, 16th, and 17th, over the lower North and South, we experienced the best rains we have had for a very long time, in most cases the ground has had a thorough soaking. The unfortunate north and north-eastern districts only got a little rain, and that was patchy, and unless they get a thorough soaking during the present month it is doubtful whether there will be any harvest again this year. Already stock are being removed to localities where feed is more abundant, and it is difficult to see what the farmers are going to do to carry on through the winter. The following rainfall records will give a fair idea of the extent of the fall during May to 28th:—Hawker, 0·410in.; Quorn, 0·760in.; Carrieton, 0·420in.; Petersburg, 0·560in.; Port Germein, 0·460in.; Port Broughton, 0·640in.; Laura, 0·870in.; Kadina, 1·270in.; Maitland, 3·580in.; Minlaton, 2·050in.; Burra, 1·420in.; Eudunda, 1·920in.; Morgan, 0·270in.; Mannum, 1·340in.; Riverton, 5·350in.; Angaston, 2·870in.; hills near Adelaide, 3in. to 7in.; Willunga, 2·690in.; South-East, about 2in.; West Coast, 1·250in. to 2·150in.

Mr. F. W. Potts, F.C.S., analytical chemist, Euroa, Victoria, gave an address before the Victorian Dairymen's Association on April 28, upon the use of preservatives in butter, and showed most convincingly from evidence furnished by innumerable researches conducted by eminent specialists in laboratory work, as well as by medical men of high standing, that there is no possibility of injury to health of human beings—but rather the contrary—through the consumption of butter which has been protected from deterioration by the addition of 0·75 per cent. of preservative containing about 0·25 per cent. of boric acid to each pound of butter after it has undergone all the processes of manufacture and packing. In medical practice this antiseptic is often administered, and used also outwardly, in large doses and quantities without injurious consequences. The conclusion arrived at on all hands is that preservatives should be used with great moderation, but that the small quantities needed to properly preserve perishable substances cannot possibly injure the consumer.

Some very extensive experiments have been conducted both in Great Britain and in Germany to test the merits of basic slag (Thomas phosphate) and of superphosphate side by side under exactly similar conditions, with the result.

that, except on peaty soils, the superphosphate was found to be immensely superior to the basic slag. In the peaty and mossy loams the slag had slightly the advantage, but in almost every other case the slag was "not in" the competition, to use a racing term. "As a dressing for grey or mossy soils and pasturage thereon, and as a preventive of finger-and-toe in turnips, slag is hard to beat; but for other purposes it would appear that its friends sometimes exaggerate its merits." So says the *Scottish Farmer* of April 16th, 1898, in summing up these experiments.

The Chairman of the Agricultural Bureau reports that the results of experiments with manures presented for trial to various vinegrowers are not at all conclusive, owing to the exceptionally dry spring and summer, but the growers may naturally expect to reap the benefit next season. One grower states that the weeds on the strip of poorest soil manured with Thomas phosphate have grown most vigorously since the rain.

It is highly probable that one or two people might make a good business by growing medicinal herbs for use in this colony. There are several kinds of roots, leaves, and flowers which lose much of their virtue by long keeping—therefore freshly-grown samples should be in demand. Amongst the plants that might be sown or planted during the present month are *Pyrethrum cinerariæfolium*, for insect powder; medicinal rhubarb (shelter in frames till September, then plant out); *Tanacetum vulgare*, tansy; *Artemisia absinthium*, wormwood; *Melissa officinalis*, balm; *Artemisia vulgaris*, mugwort; peppermint, spearmint, and pennyroyal; sage, thyme, marjoram, southernwood, agrimony, elecampane, golden rod, dandelion, Spanish marshmallow, horehound, white poppy, hyssop, rosemary, *Datura*, and very many others. To these might profitably be added a number of plants used in the manufacture of perfumes, not omitting the true lavender.

Although it is possible that it would not pay in this sparsely-populated colony to grow beets for sugar factories, there can be no doubt that on very many farms it is worth while to grow a few acres of sugar-beets for the cows. Land for beets should be deep mellow clay loams, like "Bay of Biscay" or crab-hole soil; but good crops can be raised on sandy soil rich in humus. If heavy application of farmyard manure can be given nothing more is necessary. If not, then 1,000lbs. per acre of mixed commercial fertilisers should be given, containing 6 per cent. soluble phosphoric acid, 7 per cent. potash, and 6 per cent nitrogen. Muriate of potash, nitrate of soda, and superphosphate of lime contain the required elements. Sow in drills 2ft. apart, 2in. deep; thin out to 1ft. in the rows. There are three to five seeds in each capsule, and only one plant should be left to grow. From 5lbs. to 8lbs. of seed are generally sown to the acre, but 1lb. would be ample if the seed could possibly be sown thin enough. The crop must be frequently hoed. Roots should not weigh more than 1lb. each.

The Forest Department has issued its annual catalogue of trees and vines available for free distribution. There are in all over 270,000 trees and 23,412 rooted vines available. Applications for catalogues, accompanied by stamp



for postage, must be made to the Conservator of Forests, Adelaide. The Conservator states in his introductory note that during the past sixteen years a total of nearly four and a half millions of forest trees have been distributed to our colonists, besides those planted by the department. The value of this work to the colony cannot be estimated.

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When planting timber or forest trees it is necessary to know what are the probabilities of their living. The last three years' drought has settled the question in regard to *Pinus insignis*, in which thousands of large trees have died through drought recently. *P. halepensis* stands the drought splendidly, so far. The sugar gum (*Eucalyptus corynocalyx*) does not appear to suffer in the dryest and hottest parts. At Petersburg, Carrieton, and everywhere else, the sugar gum and Aleppo pine have thriven during the worst period experienced since the first settlement of this colony.

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There are many who love to prophesy "smooth things" in the hope of securing notoriety. Amongst these men are those who try to persuade us that destruction of extensive areas of forests exercises no influence whatever upon climatic conditions. It is quite true that cases can be cited where they are *apparently* justified in that contention, but in opposition there can be cited overwhelming instances to the contrary. Anyone can satisfy himself that the air is always cooler beneath large trees in hot weather, and warmer when the weather is cold. We all know that large trees must and do transpire a great quantity of moisture. What is the effect upon the atmosphere in contact with a considerable body of living trees, which constantly maintain a normal temperature not exceeding 50° F., and are at all times (whilst making growth) giving out through their leaves and bark a vast amount of moisture?

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It is a great mistake for anyone to remain content with an "average result." The "average" farmer must always be a mediocrity. The "average" crop is not sufficient to keep things going. The "average" cow eats as much as one which gives a third more butter during the year. The "average" horse walks slower and draws less load than another which costs no more to keep, requires no more labor for attendance, but will walk a thousand miles further during the year and draw a hundred tons more in the same time. The man who keeps everything above the average is the man who succeeds, whilst the average-satisfied man is constantly in difficulty.

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An Order in Council has just been passed by the Government of Tasmania prohibiting the importation of any fruit trees, cuttings, scions, nursery stocks, or other plants. In Victoria all fruit trees imported have first to be taken to the Horticultural Gardens, Burnley, where they are fumigated and disinfected in a specially-constructed chamber. If all imported plants and all nursery stock locally produced were fumigated and disinfected before being sent away from the port of arrival or the place where grown there would be very little disease in our orchards and gardens. There are laws in the American States prohibiting the removal from any infested orchard or nursery of any plants or fruits.

Two pernicious insects have, by proclamation in the *Government Gazette*, been added to the list of pests prohibited to be imported into South Australia. Both are found upon oranges and lemons grown in Queensland, and have recently been detected on fruit consigned in bond from Sydney to Broken Hill by way of Port Adelaide. The cases were open at the sides and the young scales were found literally swarming over the cases and all surroundings. The "Purple Scale" (*Aspidiotus ficus*) is of large size comparatively, and is of a purplish color. The "White Scale" (*Chionaspis citri*) is very small, narrow, and long comparatively, but congregates in masses, presenting somewhat the appearance of ashes.

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A new enemy of the vine known to entomologists as *Margarodes vitium*, has spread considerably in South America. Its common name is "Chilian scale," and it attacks the roots of grape vines in particular as well as the roots of other plants in general. It is said to be as dangerous as the phylloxera, living altogether on the roots, and causing swellings which develop into cancers and destroy the plant. What with the horticultural pests we have and those which we fear to have imported there is much necessity for vigilance in our officers and for the loyal support of those whose interests the officers are expected to conserve.

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M. de Dubois has notified the Paris Academy of Science that he has discovered by accident a bacterium which destroys the phylloxera insect. He had thrown some earth and fertiliser on a pot containing a phylloxerated vine, and upon examining three days later on, by aid of the microscope he was surprised to find that the phylloxera insects were killed. Further investigation disclosed the bacteria, which are so small that about 100 billions would only occupy a cubic inch of space. Berkeley University (California) authorities are now investigating this matter with a view, if possible, of cultivating the bacteria, and utilising it to destroy phylloxera on a large area of non-resistant vines. It is to be hoped that this may be successful.

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Several gardeners report great success in destruction of the night-feeding weevil or "curculio" (*Otiorrhynchus sulcatus*) by spraying their trees and plants with Paris green. Mix 4oz. Paris green with 8oz. quicklime and a little water, let stand for one hour, then stir the mixture in 50galls. water, and spray the plants. Proportionate quantities may be mixed, and it is desirable to add some sugar to make the mixture stick to the foliage. It is probable this remedy would also be effective against slugs and snails.

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The *Journal d'Agriculture* says that snails and slugs can be destroyed speedily, when the leaves are off plants, by spraying morning and evening with a 4 per cent. solution of sulphate of copper, especially treating the bottom parts of the plants where the molluscs most do congregate. When the leaves are on the plants the sulphate of copper would be too strong, but summer strength of Bordeaux mixture may then be used; or, better still, equal parts of sulphate of copper and carbonate of soda in the form of bouillie bourbignonne (ammonia-carbonate of copper).

The following may be taken for what it is worth :— It is stated in the *Pacific Rural Press* that there is a small bird in Germany which lives to a considerable extent upon the larvæ of the codlin moth. The name of the bird in Germany is "kohlmeise," ornithologically it is *Parus major*, and is something like the English titmouse. There are other species of *Parus* on the continent which also eat the caterpillars, but not so ravenously as the "kohlmeise," which is said to produce ten to twelve young at a brood, and remain in the locality where hatched. The Californians are taking steps to introduce this bird into their codlin moth infested orchards. Is it not strange that we have not heard all this before?

## FORESTRY.

### THE INFLUENCE OF LOCAL CONDITIONS ON THE GROWTH OF TREES.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

(Continued from April issue.)

Among trees not indigenous to Australia, many may be found from more temperate climates, and of very different characteristics to those of our hardwoods, which afford equally plain illustrations of the influence of local conditions. The well-known oak (*Quercus robur*) provides a good example of this influence on its development, seeing that it matures far better timber on good deep soil, into which it can send its roots for a considerable distance without any check, than it does on a thin poor soil overlaying any impermeable substratum. The close proximity of other trees also affects it very materially by confining its growth within narrower limits, and thus preventing its natural tendency to spread and develop the enormous head which is a special feature in its growth. Hence it is only when straight timber is the ultimate end desired in growing it that the oak is planted closely, as when the timber is to be produced for future use in ship-building it is generally left standing at much greater distances apart. This leads to the development of the contorted, curved, and crooked limbs which prove so valuable to the shipwright, and make the branches of which the head of the tree is composed quite as valuable as the trunk, when of sufficient size, and sometimes even more so, thus forming quite an exception to the general rule, as the trunk is generally of highest value with most trees. But this is not to be wondered at when the remarkable dimensions to which oak tree limbs can attain are taken into consideration.

The great difference in the influence exerted by water on tree growth when it is running or circulating constantly through the soil and when it is stagnant is shown in a very marked manner in the case of the Weeping Willow (*Salix babylonica*), and many other trees. This tree grows well in many places along the Murray river in this colony, not only on the banks by the side of the river, but also in parts where it is totally surrounded by the water; but no ill effects are felt in any way by the trees, as the water is constantly on the move. At the Leg of Mutton Lake, near Mount Gambier, however, a tree of the same kind, which was planted close by the lake some years ago, when it was very much smaller than it is now, has since died, because the water of the lake has for several years past gradually increased, from some unexplained cause, to such an extent as to completely surround it. Many other trees of considerable value have also been killed there by the same cause. The impression is often entertained that trees cannot have too much water, but from this, and many similar instances that might be adduced, it is plainly evident that it is a very important question whether the water is moving or stagnant, even with such a lover of water as the willow tree; while of course with many trees an excess of water,

either in circulation or stagnant, is highly injurious and often fatal. Proper attention to the question of drainage is the only way to cope with an evil of this kind. Many a hitherto unsuitable position may be largely improved by making suitable drains to carry off the excessive moisture, as this will alter the cold and inhospitable nature of the soil, and produce conditions more in keeping with the trees' requirements for greater warmth and better circulation of air about their roots.

Turning to another tree of a different character for an illustration, we find that the Scotch pine (*Pinus sylvestris*) soon shows in a very definite way the baneful influence exerted on its development when the conditions of well-drained and elevated soil which it requires give place to a sodden swampy soil. This tree is met with not only in Scotland, but also in many parts of England, and on the moors, and waste "heaths" in the counties of Hampshire, Dorsetshire, Devonshire, and others, can often be seen thriving well in all stages of growth, from the little seedling or larger sapling to the older matured tree, with its characteristic red bark and spreading head, wherever it stands on *its favorite sandy soil* resting on a well-drained subsoil. But wherever a few saplings have by chance come up rather too close to the more swampy low-lying parts, the scanty scattered leaves (or "needles") show clearly enough by their yellow, starved, unhealthy appearance that the trees have got astray from their proper soil and conditions. Similar results are apparent occasionally in this country in the growth of several pines, such as the Remarkable pine (*P. insignis*), the Aleppo pine (*P. halepensis*), and the Maritime or cluster pine (*P. maritima*), for instance, where they have been extensively planted over a considerable area. When only a few of these are planted for either shelter or ornament, a good site would in most cases be selected, where they would generally succeed. But in laying out a larger area for plantation purposes, it sometimes happens that a small patch of land, say half an acre or more, may be included where the rains cause more water to collect than at other places, and where the soil is incumbent on a badly drained subsoil; the consequence is that in the winter the land is sodden with moisture, and often in the summer time the same land will set down very hard. In such spots the pines referred to seldom grow to their proper size, and are generally stunted and of little or no value, frequently showing much the same yellow and unhealthy appearance with the leaves as the Scotch pine already described.

The Norway spruce (*Abies excelsa*), from which the "Baltic deal" or "white deal" of commerce is obtained, is another instance of the varying results caused by an alteration in the local conditions of its growth. This tree requires a rich, moist soil to produce timber of good quality, and does not succeed on dry rocky situations. When grown on such a site the timber is brittle and short-grained. It is stated by Mr. W. Stevenson, in a series of articles written for the *Timber Trades Journal* on the "Trees of Commerce," that the "finest forests of this tree are on the eastern shores of the Baltic, between Memel and Königsberg, where the surface consists of a thin stratum of black peaty soil incumbent on a bed of sand, the whole of which is under water a great part of every winter." Its requirements therefore are, it is evident, quite the opposite of those of the Scotch pine. Grigor, in his "Arboriculture" states, regarding the spruce, "it is one of the few trees that will thrive where the subsoil is retentive and wet. Even in dry sandy soil, unsuitable for the growth of its timber, the spruce often advances sufficiently to form a shelter for the establishing of other sorts, which ultimately become more valuable; but on approaching the size of a timber tree in such situations, it assumes a sickly aspect and presents a scanty foliage, compared with the luxuriance of the tree in the cool alluvial deposits of the sheltered glen, where it is developed in its most attractive form."

On considering the difference in the behaviour of the Scotch pine and the Norway spruce, under similar circumstances, it is easy to see how exceedingly unsatisfactory the results would be if a planter failed to regard the peculiar likes and dislikes of each tree, and placed the former on a wet "site," and the latter on a dry "site." It is clear that "what is one tree's meat is often another tree's poison," to adapt a phrase from the well-known adage regarding man, and this emphasises the necessity for making a careful study of all local conditions when any arboricultural operations are undertaken; as, though these trees cannot be grown on an extensive scale here, there are other trees native to the country presenting equally strong contrasts in their respective requirements, and the neglect to study their individual needs can only result in failure.

## POULTRY NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY D. F. LAURIE.

Last month I dealt with the Dorking fowl, taking the breed as the leading one as regards the production of table poultry. I have on previous occasions dealt with the subject of table poultry, pure or crossed, and have urged breeders, and poultry owners in general, to improve the quality of their stock. In dealing with such matters, one is allowed to constantly revert to former arguments, for we all know that a mere bald assertion, even if backed up by all the experts and successful men in the world, is not of necessity convincing to those to whom the view is new. I propose in the present article to deal with a laying breed, and for the purpose will select the Minorca, a most prominent breed at present, also one of long standing, one of the best, if not the best, of all breeds where laying is a consideration. Following the above, and without giving a detailed account of what is known of the history of this breed, I may state that it was well known in England, especially in the west, seventy or eighty years ago, and we have records earlier than this. I have within the last few weeks questioned gentlemen who were born in Cornwall or Devonshire from forty to sixty years ago, and in every case they either knew the fowl by name, or could give a fair description of it. So we see that the Minorca is not one of the new-fangled breeds some wiseacres object to. Laying is a matter of strain more than of breed; but certain breeds have always enjoyed a celebrity on account of their great laying powers. There are other excellent laying breeds besides the Minorca, but I will show why I have selected this breed in preference to Leghorns and Andalusians especially. Everyone is not able, perhaps, to purchase stock of sufficient quality to breed pure birds from the beginning; on the other hand, most people can afford to purchase a good cockerel or two to mate with the pick of their common hens. As laying is the main feature, the best layers with the most vigorous constitution should be selected and mated, say one cockerel to seven hens in confinement, or one to eleven or thirteen hens if allowed unlimited range. The bird may have as many hens as he can look after, as the more wives the more pullets will be bred, all things being equal. At present, owing to the enterprise of certain breeders, we have some very high class specimens of the breed in South Australia. Prominent amongst these we find Messrs. Eldridge, of Norwood, who has imported from England several times, and also purchased choice birds from the other colonies; Miers, of Goodwood, who has done likewise, and has just landed a pair of fine hens; Cope, of Mount Barker, who has a large stock; Hair, of Kanmantoo; and Minard, of Mitcham. Personally, I am a great admirer of the breed, and always keep them. The Minorca should be,

and is, a large square-bodied fowl, carrying a good amount of fine flesh of good quality. Added to these points we have wonderful laying powers; the eggs are large, white-shelled, heavy, and of excellent flavor. I wish to accentuate these points, as it will readily be seen that the introduction of birds of the right stamp will, while increasing the laying power of the progeny, as a rule increase the size, as compared with ordinary farm stock. As will be seen from the weights quoted later on, the Minorca is a fairly large bird, fine in bone, and having but little offal or waste. Leghorns and Andalusians are smaller, and so lose much in comparison. Mongrel birds, containing Brahma and Cochin blood, may look large; but then if the flesh be weighed, and the bone and offal, it will be found that the record is a bad one on weight alone without regard to quality. Many people own Langshans, good layers also. The introduction of Minorca blood will be found most satisfactory: the resulting progeny will be symmetrical black birds, as a rule clean-legged, excellent layers, and nice plump birds of good quality as table fowls. We hear good reports of the Orpington. The original, the single-combed black Orpington, owes its presence to the cross between the Minorca, Langshan, and Plymouth Rock, the latter having undoubtedly Langshan blood in its composition. Many Plymouth Rock chicks come black, such as these were used. My experience of the Minorca-Langshan cross dates back many years. I was among the first to recognise its merits and recommend the cross. Crossed with Malays or Indian Game we get a very fair, plump, table bird of good quality, and often the pullets are remarkable layers. Crossed with the Dorking we get an excellent all-round bird; even when mated with the despised Cochin or Brahma (from a utility point), we find the pullets excellent layers.

The egg industry is one that is poorly attended to by our producers. We have everything in our favor for making it a most profitable occupation. I need hardly say that profitable occupations are somewhat scarce, especially those suited for the old, physically deficient, or those in search of a light occupation. The introduction of Minorca blood, aided by a little common sense in the matter of selection, should result in a flock of pullets of high average laying powers. Those who contemplate following my advice will do well to market nothing but infertile eggs, that is, they should not have cock birds running with the hens.

Leading Adelaide firms will purchase such eggs in preference, if assured of their infertility. Fertile eggs contain germs, which on exposure to heat will germinate; if the heat is sufficiently continuous the egg may hatch, if not the germ will perish and the egg will go bad. Dealing with a laying breed, I naturally refer to all matters of interest connected with eggs. We have in our Produce Export Department all the machinery, &c., of a thoroughly equipped agency for exploiting the export egg trade; we only lack enterprise and eggs as the producers' contribution.

Quite recently Mr. W. Thyer, of the well-known firm of produce merchants, Adelaide, sent me some eggs to sample; they had been upwards of six months in his refrigerator, and were ordinary farmers' eggs purchased in the open market. As a rule I am not partial to eggs of uncertain age. However, some were boiled and pronounced excellent; others were fried and were likewise good. I carefully examined those which were fried (before cooking) and found the yolks intact, and the whites in good order. I incline to the opinion that all these eggs were fertile. I tested by the usual method, and found I could not detach the cicatrice, which is the seat of the germ; in an infertile egg this is detachable. The result of this experiment proves beyond doubt that we can ship and land eggs on the English market in prime condition. I will now proceed to give the standard definition of the Minorca fowl, which will enable purchasers to gauge the value and merits of different specimens. While small

specimens, such as are commonly seen, are good layers, experience has proved that the large, square birds are even better layers, and of course more valuable for crossing for size. Minorcas are bred in two colors, black, and white; the latter are rare in this colony, although I have seen a few. I shall content myself with the publication of "The Minorca Club of England's" standard:—

*General Characteristics—Cock.*—Beak, fairly long but stout; head, long and broad, so as to carry comb quite erect; comb, single, large, evenly serrated, perfectly upright, firmly set on head, straight in front, free from any twist or thumb mark, reaching well to the back of the head, moderately rough in texture, free from any side sprigs; wattles, long, rounded at the ends; face, fine in quality, as free from feathers or hairs as possible, and not showing any white; earlobe, medium in size, almond-shaped, smooth, flat, fitting close to the head; eyes, full, bright, and expressive; neck, long, nicely arched, with flowing hackle; body, broad at shoulder, square and compact; back, broad and rather long; wings, moderate in length, neat, and fitting close to body; breast, full and rounded; thighs, feet, and legs, medium length and stout; toes, four; tail, full, sickles long, well arched, and carried well back; size, large; carriage, upright, graceful; weight, from 5½ lbs. to 8 lbs.

*General Characteristics—Hen.*—Beak, fairly long, but stout; head, long and broad; comb, single, fairly large, evenly serrated, arched, drooping well down over side of face, slightly rough in texture, free from any side sprigs; wattles, long, rounded at the ends; face, fine in quality, as free from feathers or hairs as possible, and not showing any white; earlobe, medium in size, almond-shaped, smooth, flat, fitting close to the head, rather more rounded than in cock; eye, full, bright, and expressive; neck, long, nicely arched; body, broad at shoulder, square, and compact; back, broad and rather long; wings, moderate in length, neat, and fitting close to the body; breast, full and rounded; thighs, legs, and feet, medium length and stout; toes, four; tail, full, neat, carried well back; size, large; carriage, upright, graceful; weight, from 5 lbs. to 6½ lbs.

*Color of Black Minorcas.*—Cock and Hen: Beak, dark horn color; eye, dark; comb, face, wattles, dark, blood red; earlobe, pure white; legs, black or very dark slate; plumage, glossy black.

*Color of White Minorcas.*—Beak, white; eye, red; comb, face, and wattles, blood red; earlobe, pure white; legs, pinky white; plumage, glossy white.

*Value of Defects in Judging.*

Defects in face, bloated red, coarseness, or too hairy .....	15 points.
Bad shape or twisted comb .....	15 "
Want of size .....	15 "
Wrinkled, folded, or stained lobe .....	10 "
Defects in color .....	10 "
Want of condition .....	10 "
Want of style and symmetry .....	10 "
Too light legs, eyes, or beak .....	8 "
Crooked breastbone .....	7 "

100 "

A perfect bird to count 100 points.

*Fatal Defects.*—White in face; wry, or squirrel tail; feathers on legs; other than single-combed; colored plumage, other than black and white in the several varieties; other than four toes; legs, other color than black or slate in Black Minorcas, or white in White Minorcas.

I should strongly advise my readers not to purchase any fowl having a crooked breastbone; such a defect is often the result of in-breeding, and may point to hereditary defect and lack of stamina. White in the face is a serious defect, and is a sure sign of Spanish blood.

In the foregoing I trust I have not only been explicit as regards the points and also the value of the Minorca, but have also called attention to the egg-producing industry. I have never countenanced the advice often given, of purchasing mongrels with a "good dash" of such and such blood. Buy good stock, select your hens, and improve your stock yourself; you then know what you are doing. At any rate do not waste money on mongrels. For egg-laying, a good layer of any breed is invaluable; but remember that, to ensure a continuance of such, the breeding must be from pure birds of a good laying strain of an egg-laying breed. Breed a reasonable sized mob of first-class layers, treat and feed as I have in former articles suggested, and you will derive a sure and excellent profit.

## THE BEEHIVE.

## NOTES AND HINTS FOR JUNE.

BY APIS LIGUSTICUS.

If the few simple directions given in the May number of the *Journal* have been attended to, there is little to be done with bees during June, in fact it is better to leave them quite alone. Opening the hives at any time at this season must be injurious to the bees, and would probably injure or destroy the young brood. Should it be absolutely necessary to open a hive for inspection, this should be done in the middle of a fine day, and the frames replaced as quickly as possible. See that all roofs of hives or sheds are watertight, and do not let cockroaches or other pests find a harbor in the hives.

This is the proper time to melt into wax the season's collection of fragments of combs. There are many methods of doing this, and the simplest is by the use of a wax extractor. In the absence of an extractor the wax may be secured in the following manner:—The collection of scraps should be sorted over, and all clean pieces of comb in which no breeding has occurred should be picked out. These should be put in a vessel with plenty of water and brought to the boil, and then stood on one side to cool as slowly as possible, so as to permit the heavier dirt to sink to the lower surface. Next day the cake of wax can be lifted, and the lower part scraped off. The removed *débris* should now be placed with the pieces of old brood combs and boiled in water, and treated in the same way as described for the clean combs. After cooling the dirty mass should be placed in a cheesecloth bag along with a weight, and once more boiled with water, when it will yield almost all its wax if it be kneaded with a stick, and thus left to slowly cool as before. It should be noted that when combs are placed in water and boiled, there is always the danger of boiling over as the molten wax impedes the escape of the steam. For show purposes perfectly clean wax may be obtained by repeating the process of melting over boiling water until every particle of dirt is removed. The wax should then be cast in moulds which should be very sparingly oiled to prevent sticking. The cake of wax should be allowed to cool very slowly, otherwise it will crack.

Those who wish to improve their breed of bees by crossing them with the Ligurian bee should recollect that queens are easily obtained from Italy, and that the cost of them is very moderate. They are now sent by parcels' post, four queens in one package, and thanks to the care given to them on the ocean steamers the risk is small. If orders are sent about the end of this month, the queens would arrive here just at the right time. It seems a pity that after all the trouble that was taken some years ago in setting apart Kangaroo Island as a locality for Ligurians that we should have to send out of the colony to get this superior breed of bees. Not only is there an Act of Parliament dealing with this business, but, through the efforts of the Chamber of Manufactures and the South Australian Beekeepers' Association, the Ligurian bee was firmly established on the island. It seems almost incredible that with all these advantages no beekeeper has had the enterprise to establish himself there with a view to breeding and shipping these bees to all parts of Australia. The money that goes from Sydney, Melbourne, and Adelaide, to Italy each year in payment for Ligurian queens might well be secured for South Australia.

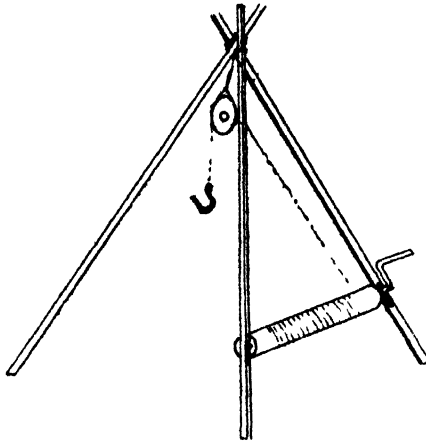
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**CABBAGE CATERPILLAR.**—Dissolve 4ozs. powdered alum, 1lb. coarse salt, and 1lb. slack lime in  $\frac{1}{2}$  gall. of hot water. Spray plants attacked with 3 fluid ounces in 3galls. of water.



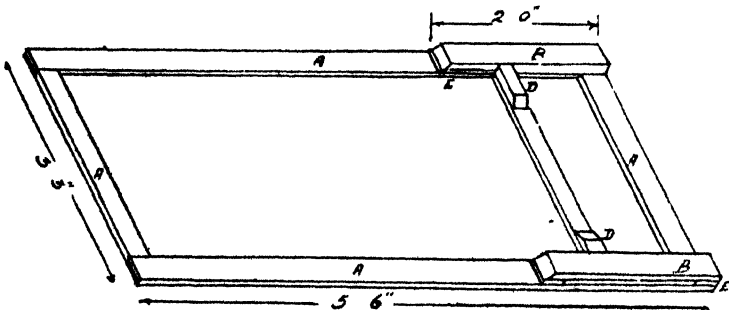
## SOME HELPS FOR THE FARMER.

**TRIANGLES FOR SLAUGHTERING.**—The triangle explains itself very fairly. The poles should be long enough and strong enough to support a bullock, and should be set up as here shown.



The windlass can easily be made from a round log, and the ends can be cut so as to avoid the necessity for iron pins or spindles. Instead of having iron staples made, a couple of holes can be bored through each of the two posts and fencing-wire loops made. The handle can also be manufactured on the farm, by using a couple of pieces of wood and a little ingenuity.

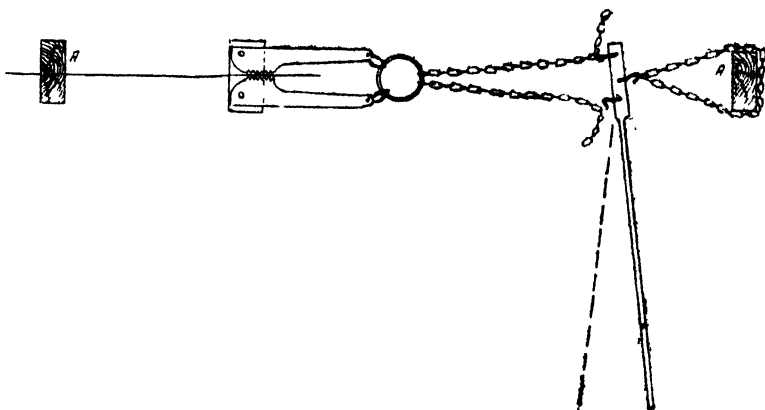
**SHEEPSKIN STRETCHER.**—The Australasian Mortgage and Agency Company, Limited, publish a leaflet in which a useful sheepskin stretcher is described. Pieces marked A represent the frame, 5ft 6in. long by 3ft. 3in wide; to be properly secured (halved) at all corners. Material to be 3in. by 1in. Pieces marked B are 2ft. long by 3in. by 1in., blocked up on 1in. thick blocks, to form a slide for rail marked C. Piece marked C is a movable rail, the length of full width of frame by 3in. by 1in., having blocks affixed, as shown (marked D) on each end, to prevent it working out. Blocks marked D to be 3in. by 1in. and 6in long, securely nailed on to rail C, as and where shown. Blocks marked



E to be 3in. by 3in. by 1in., fixed where shown, and of thickness sufficient to allow slide (marked C) to work freely. The slide C and the sides and end of frame (A) to be bored, in order to save splitting, every 6in. apart, and 4in.

nails (wire) to be inserted, points upward, upon which to stretch skins. Pieces marked B to be bored for 4in. nails, as shown, holes about every inch of the length, and to be bored both through B and the part of frame A that is immediately under pieces B. These will thus form pins to keep rail C stretched to the length required. Plane off all sharp edges. The following directions should be observed in stretching the skins:—Stretch the tail first, on centre pin of bottom rail; then the two hind legs at corners of bottom rail; then the two fore legs as far as possible up the sides; afterwards the sides of skin (narrowest portions first), and lastly the neck to the movable bar.

**FENCE-WIRE STRAINER.**—Mr. G. H. Dunn, a member of Johnsbury Branch, sends description of an improvement upon a fence-wire strainer, as here shown:—



Pieces marked A and A represent fence posts. Between these, on the left, is a block of iron to which two steel pieces are pinned; these act as hinged clamps or jaws to clasp the end of the wire to be strained. The other ends of the toothed jaws are attached to a ring, to which two pieces of chain with moderately large links are attached, and these chains are used alternately to haul upon the wire by aid of a lever fitted with three hooks, and attached to the post on the right-hand side. The lever is somewhat like a steelyard. When the handle is pulled to the left the hook is brought down so that a grip can be taken in a link further to the left, whilst the other hook has dragged the wire and jaws to the right. A reverse movement of the lever drags the whole still further to the right, whilst the other hook is enabled to take a fresh grip further to the left, and so on until enough slack wire has been gathered in.

## HOUSEHOLD HINTS.

**OLIVE OIL IN COOKERY.**—On the continent of Europe olive oil is very largely used in cookery, but in Australia its value is not well recognised. It is much nicer, more nourishing, and more easily digestible than animal fats. Used in pastry it makes a much lighter crust than lard, dripping, or butter.

**BUSH TOASTING FORK.**—Two pieces of No. 8 fencing wire, each 5ft. long, double them and place the loop over a ½in. peg fixed upright in a stump, so that the wires can be twisted. The loop around the pin serves to hang the fork by. Sharpen up the points and bend them to the proper angles for prongs.

**HONEY VINEGAR.**—Probably the best vinegar is made from cider, and the next best from honey, closely followed by that made from wine. One pound honey to each gallon of water, placed in a barrel in a warm situation; cover the bung-hole with a piece of close wire net to exclude flies. The process can be expedited by placing a cup of good vinegar near the bung-hole, with several worsted threads leading from the vinegar into the barrel, by which the liquid is slowly carried by capillary attraction into the barrel.

**LEMON MARMALADE.**—Some people like the flavor and color of lemons preserved alone. It is done in exactly the same way as orange marmalade. Cut the lemon into four, and slice it very thinly, rejecting nothing but the seeds, and these may be put into a muslin bag and boiled with the fruit. To each pound of fruit add three pints of water, and let it stand till next day. Then boil it till the chips are quite soft. Weigh it, and to each pound add a pound and a half of sugar, or you will be safe to allow a pound and a half to a pint; but the juice of this fruit varies so greatly that more or less sugar is required, so put in less than the full quantity at first, and if, after boiling twenty minutes, it does not jelly add more sugar. If boiled for an hour or two, as some recommend, the color and flavor are not so fine.

**BREAD-MAKING.**—Mr. H. Broad, Arrowie Station, *via* Blinman, whose paper on "Bread-making" appeared in the May issue of the *Journal of Agriculture and Industry*, now writes, in answer to an inquiry, that for 50lbs. flour he would use 2qts. of his yeast and 8ozs. salt.

**TO DESTROY HOUSE FLIES.**—Experiments conducted by officers of the U.S.A. Department of Agriculture show that by sprinkling fresh horse manure with kerosene and water, and mixing it thoroughly, every larva of the ordinary house fly was destroyed. As stables near houses are the principal breeding grounds of this troublesome friend, this remedy is certainly worth a trial. The manure should be removed daily from the stable, and every third or fourth day the heap treated with kerosene. One pint of kerosene is sprinkled over about 2galls. of fresh manure, then a little water added, and the heap well forked. This would prove too expensive on a large scale, but where one or two horses only are kept it is well worth trying. Probably a little less kerosene would have an equally good result. One pound chloride of lime thoroughly mixed with 2galls. fresh manure also destroyed all larvæ of the house fly.

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## VALUE OF STERILISED MILK.

By J. KINGSTON BARTON, M.R.C.P., LATE SURGEON TO THE KENSINGTON DISPENSARY.

(From the *British Medical Journal*.)

During the past year there have been the most conflicting statements concerning the virtues and vices of sterilised milk. The scientific chemists state that heated milk has lost many of its nourishing qualities, and of late they state the destruction of pathogenic bacteria includes the slaughter of many most beneficent micro-organisms. Medical men, having seen the enormous saving of infant life since the introduction of sterilised milk, will take the opposite view to the scientists.

Having devoted special attention to this matter during the past two years, I would venture to make several positive statements:—1. Completely sterilised milk, if administered without any fresh food, will undoubtedly sooner or later produce scurvy. 2. Comparatively or temporarily sterilised milk may be administered for any length of time without fear of scurvy appearing. 3. Completely sterilised milk, if administered at once in perfectly clean bottles,

spoons, or cups, can be relied upon as free from any pathogenic bacteria. 4. The heating of milk alters very slightly, if at all, its nourishing qualities. 5. All kinds of sterilised milk, if free from added chemicals, can become foul as quickly, if not quicker, than ordinary fresh milk. 6. All sterilised milk that is put into hermetically sealed vessels, and which can keep fresh in them for several or many days, will produce scurvy unless some fresh food is administered daily; one meal of fresh whey daily will achieve this in younger infants than those who may have fresh vegetables, meat or fruit. 7. Milk that is raised to the boiling point, or better, to within two degrees of the boiling point, and maintained there five to fifteen minutes, is "comparatively" sterilised, and will never produce scurvy, and is almost quite safe from pathogenic organisms.

Nos. 6 and 7 are merely extensions of Nos. 1 and 2. If milk is placed in a china vessel which stands in another vessel containing cold water, and this is brought to the boiling point, then the milk will not itself boil within the first fifteen minutes after the water boils. This heated milk does not lose its antiscorbutic properties for at least twelve hours.

Milk that is boiled direct over the fire undoubtedly constipates; but milk that has water placed between it and the fire does not produce this trouble. The only chemical permissible is a small quantity of bicarbonate of soda to be added to the fresh milk before it is scalded. This is to neutralise the acidity which appears in cow's milk soon after it is drawn from the cow, and in the second place the saline seems to produce increase inflow of bile.

To sum up, if you would steer clear of scurvy and avoid pathogenic microbes, then obtain as clean fresh cow's milk as possible twice a day in winter, three times a day in summer, and scald it soon after its receipt, of course every precaution being taken to prevent contamination of the scalded milk between the time of its sterilisation and administration. As to the strength of milk and water, &c., to give hand-fed infants, that is altogether too wide a discussion to enter upon here. I wish merely to answer the question of how to avoid scurvy.

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## THE DAIRY.

### SEPARATION AND BUTTER FAT LOSSES.

By G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

When separating milk and converting cream into butter the aim of the manufacturer is to retain the greatest possible quantity of butter fat. Before this can be accomplished, in the case of the separator, the working capacity of the machine must necessarily be absolutely perfect. Particular attention must be directed to the rapidity of the drum; for, in order to attain efficient separation, the revolving capacity must not be less than the guaranteed speed, but this speed should be tested to ensure safety and give the desired proficiency of separation. The higher the number of revolutions attained by the separator drum the more perfectly is centrifugal force brought into play, and accordingly the percentage of fat left in the milk is less. Centrifugal force may be practically defined as that force which tends to drive surrounding bodies from the centre of the revolving axis. With the separator the greatest strain is exerted by the internal force upon the walls of the drum. Were we to increase the revolving speed of the drum to excess great danger would be incurred, as the centrifugal strain might result in complete wreckage of the most valuable part of the machine.

*Inflow of Milk.*—Upon the entrance of milk to the separator it falls to the bottom of the drum, is next thrown to the remotest parts with extraordinary rapidity, and as the inflow of milk is increased the drum becomes gradually

filled, commencing from the walls and extending inwards against centrifugal force and towards the axis of revolution. It thus occurs that the heavier solids of milk are driven furthest away; the lighter, as fat, possessing greater resistance, collect nearer the centre of the drum. Ultimately, as the drum becomes full, the cream finds its escape from the upper and central part, the skim milk from the upper part also, but further back. The reason why the cream and skim milk are made to escape from the upper and narrower part of the drum is that centrifugal force is decreased, because nearer the centre of the axis of revolution. Were the escapes to be constructed from the under and furthest away wall of the drum, the greater force exerted there would drive the milk and cream out with excessive rapidity. The regulation of milk admitted into the separator greatly influences the efficiency of separation of fat. If admitted in excess, and the cream allowed to pass out regardless of attention to the thorough exposure of the milk to centrifugal force, a fat loss will certainly be sustained, together with an alteration of the cream-raising co-efficient.

*Temperature of Milk.*—A point of the highest importance in regard to successful separation is temperature of the milk to be separated, as the lower the temperature the less the efficiency of separation. When milk is heated to a temperature of 95° F., or above, the following favorable conditions exist:—

- (a) The milk assumes a more fluid condition;
- (b) Is less dense (has a lower specific gravity);
- (c) The fat globules have a decreased grouping influence;
- (d) The viscosity of albuminoid constituents of milk upon fat is rendered less.

These four circumstances will readily convince one that much greater resistance is offered by the fat at a high temperature, and more nearly perfect separation is within reach.

*Varied Conditions of Milk.*—With regard to variations in conditions of milk as to richness, the richer the milk and the smaller the fat globules the more difficult is separation; also milk coming a long distance and being continuously shaken and sterilised milk each add to the difficulty, and require consideration in the separating process.

From what has been stated we may conclude that in order to accomplish successful separation the following essential conditions require strict attention:—

1. The number of revolutions of separator drum or bowl must be in accordance with the advised and guaranteed speed given by the makers.
2. Separation must not be conducted at a temperature below 85° F.
3. The flow of milk admitted to the drum must not be in such excess as to cause insufficient exposure to centrifugal force.

When butter is made from separated cream a 15 per cent. cream will be most suitable, averaging 25 per cent. fat.

A variation of the above conditions may, however, be made after a test has been taken of the revolving speed of drum, cream co-efficient and percentage of fat in cream, and fat test of separated milk. It cannot be too strongly impressed upon all those who work separators to regularly test the speed of the drum and the percentage of butter fat left in separated milk. When default in any one of these important points is observed, then at once study the working of the separator in order to overcome the error. It is not recommended to separate cream for butter-making at less than 10 per cent. of the weight of the milk. With a 10, 15, or 20 per cent. cream, and an unaltered condition of the inflow of milk and speed of drum, no increase in the fat percentage of the skim milk will occur. In order to arrive at the percentage of cream

separated and percentage of fat in the cream, the following equations by Fleishman will explain:—

Let  $F$  denote percentage of fat in milk.  
 Let  $F_1$  denote percentage of fat in separated milk.  
 Let  $R$  denote percentage of cream separated.

With a 15 per cent. cream separated, 3·5 per cent. of fat in milk, and ·15 per cent. fat in separated milk, then

$$x = \frac{100(F - F_1)}{R} + F_1 = \text{percentage of fat in cream.}$$

$$\frac{100(3\cdot5 - \cdot15)}{15} + \cdot15 = \frac{335}{15} + \cdot15 = \frac{67}{3} + \cdot15 = \frac{1349}{60} = 22\frac{1}{2}.$$

$$x = 22\frac{1}{2} \text{ as percentage of fat in cream.}$$

In order to find the percentage of cream separated which we took at 15,

$$\text{Then } R = \frac{100 \times (F - F_1)}{x - F_1} = \frac{335}{21\cdot86} = \frac{33500}{2185} = 15\frac{1}{2}.$$

At the conclusion of separation the separator drum and enclosed parts must necessarily be treated with a solution of soda, washed and thoroughly scalded. When the process of separation is again about to be commenced have all the bearings thoroughly oiled, fill the drum slowly with hot water, and very cautiously bring up the speed to the full capacity. This will ensure a beneficial starting-point in the milk separation. An indicator to ascertain the number of revolutions per minute of the drum ought to be attached to every separator. As I have said at the commencement of this paper, the aim of the manufacturer when separating milk and making butter is to retain the highest possible quantity of butter fat, only unavoidably allowing the merest trace to escape conversion into butter.

Wherever separation of milk and butter-making is conducted the motto "Fat is gold" ought to be constantly recognised. How much of the greatly sought-after "gold" dribbles away in the dairy waste unheeded by the eager seekers? Again, how much gold falls in a solid, refined condition, due to faults in the worker, upon the floor of the factory to be run into the wealthy underground reservoir? In this pit is much of the financial fat which ought to be in the pockets of the dairyman.

Let us consider the fat losses sustained by butter factories when insufficient attention is paid to separation, when milk and cream is supplied in varied conditions of acidity, caused by neglect to cool on the part of the suppliers, when no refrigeration takes place in the factory, whereby churning temperatures in the summer months with unconditioned cream range from 60° to 70° F. Not only will we lose excessively in butter fat when such circumstances are allowed to prevail, but the inferior butter manufactured will give but a scanty return.

*Separation.*—In separating milk a sufficient number of trials have shown that milk can be skimmed so that only 0·1 of 1 per cent., or less, of fat is left in the skim milk. If the separator leaves 0·2 of 1 per cent. of fat, the loss to the factory of this extra ·1 on, say, 500galls. of separated milk will amount to 5·185lbs. of fat.

As pure butter contains 86 per cent. of fat, equal to 1lb. of fat in 1·16lb. of butter, what quantity of butter does 5·185lbs. of fat represent? Thus:—  
 1 : 5·185 :: 1·16 = 6lbs. Taking 6lbs. of butter as the dairy loss on treatment of 500galls. of milk, and the average price of butter at 1s. per lb., the yearly loss, working 300 days, will amount to £90.

*Butter-making.*—When 0.5 of 1 per cent. of fat is lost daily above the maximum percentage of fat left in the buttermilk, the annual loss in an ordinary-sized factory may be put down at £100. Reduced price, due to inferior butter, cannot be estimated at less than £100, and the waste upon the floor £10, making the annual loss to the factory of £300.

These figures are very large, but during the summer months extraordinary losses must occur when churning temperatures range from 60 F. to 70 F., and I would not like to estimate how much money per week in butter fat is lost in the buttermilk. A test for fat in the buttermilk should be made regularly, and when found above the average the cause must be ascertained. The only satisfactory way of preventing this heavy annual loss is by the introduction of refrigerating machinery to our factories.

## BRITISH AGRICULTURAL IMPORTS FOR 1897.

The total value of the imports of agricultural products into Great Britain for 1897 was £158,000,000, showing an increase of £6,000,000 over the previous year.

Meat of all kinds, live and dead, excluding rabbits, was responsible for £38,205,000, an increase over last year of £3,500,000. Rabbits to the value of £543,494 were imported, an increase of £143,000 over previous year. Importations of bacon and ham still increase, 1897 showing three quarters of a million cwt. beyond previous year.

Cereals, comprising wheat, £23,363,000; maize, £9,188,000, amounted in all to £50,872,000, an increase in value, but a very large decrease in quantity as compared with previous year. From Argentina less than one million cwt. of wheat were imported, as against eleven and a half millions two years previously; from Australasia from three and a half millions of cwt. in 1895 to nothing at all in 1897; from East India half a million in 1897, against eight and a third millions in 1895; Russia seven millions, instead of fifteen; the total decrease in importation of wheat and wheat meal and flour under previous year being nearly ten millions of cwt., notwithstanding that the United States increased her export to the extent of about eight and a half million cwt.

In dairying, the declared values of imports amounted to £25,697,000, and that the consumption in England is still growing is shown by the fact that this exceeds the amount of the previous year's importations to the extent of £1,778,000. In butter, 3,217,801 cwt., valued at nearly sixteen millions sterling, were imported, an increase of 180,000 cwt., value £580,000, beyond the previous year's importations. Denmark sends about 40 per cent. of the butter imported into England, while the whole of Australasia sends just one-fifth of that amount, or 271,000 cwt. In cheese, Canada still leads the way, sending over one and a half million cwt. out of a total of over two and a half millions. In this line the total imports exceed those of 1896 by 359,000 cwt., valued at £980,000. The imports of margarine have remained about stationary for three years at a little under a million cwt. per annum.

Poultry and game to the value of £730,000 were imported, while the value of the eggs imported was £4,356,000, an increase of £170,000 over the previous year.

**A CHEAP PAINT.**—For wood, iron, or stone, make no more than a gallon at a time for immediate use before it sets. Stir good hydraulic cement—Roman cement will do—into skim-milk until the mixture is as thick as cream. Apply with a whitewash brush. Can be colored with chrome yellow, Prussian blue, venetian red, or other coloring.

## QUESTIONS AND ANSWERS.

**MIXING FERTILISERS.**—*Question.* Would it be right to mix Thomas phosphate or wood ashes with English superphosphate to make the super. run through the drill more easily? *Answer.* By mixing lime, or any substance containing lime, with superphosphate, a reversion, more or less complete will be induced, that is, the superphosphate will become less soluble. Thomas phosphate and wood ashes both contain a large percentage of lime, and it would therefore not be desirable to mix either with the superphosphate.

**PICKLE FOR MEAT.**—*Question.* Wanted a really good pickle for pork, beef, &c. *Answer.* Mount Compass Branch member furnishes the following:—"This is a good recipe for curing pork or beef:—To each gallon of water take 1½lb. salt, ½lb. sugar, ¼oz. saltpetre, and ½oz. pure potash. In these proportions the pickle can be increased to any quantity desired. Boil until the scum from the sugar has risen to the top, and has been skimmed off. When cold pour it over the pork or beef to be cured. The meat must be well covered with the pickle, and ought not to be put down until two days after killing, during which time it should be lightly sprinkled with powdered saltpetre to remove the surface blood, and leave the meat fresh and clean. In curing beef the pickle will have to be drawn off, boiled, and skimmed three times, after which it will remain clear; but for pork one boiling is generally sufficient. It also requires more pickle for beef than for pork on account of the waste in boiling. This recipe needs to be tried but once to be appreciated, as the meat is unsurpassed for sweetness, delicacy, and color. It requires to be kept in a sweet clean barrel."

## FARM NOTES.

*Written for the "Journal of Agriculture and Industry."*

By W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,  
ROSEWORTHY, SOUTH AUSTRALIA.

During this month a multitude of letters has reached me relative to difficulty farmers meet in getting English superphosphate to run evenly through the drills. The difficulty is a real one, but the blame is not to be ascribed to the manure; the defect is in some of the drills now being sold. English superphosphate is ground very fine, and it is important that it should be so ground, but being so very fine and somewhat adhesive it hangs in the manure-box, and concaves over the feeders with the result that one or more coulters may run no manure for considerable distances unless carefully watched. Without doubt there ought to be in every drill a stirrer working slowly in the box to disturb the manure and ensure its falling on the feeders. In the old drill a stirring comb worked slowly transversely in the box, and some modern drill makers have wisely retained the mechanism. The difficulty is by no means confined to English superphosphate, but it is met in the distribution of all finely-ground slightly adhesive artificial manures. It is delaying and annoying to have to stop every few chains to stir the manure in the box with a trowel or something such equally handy, and if drillmakers could hear the exclamatory phrases breathed by way of relief by those working drills in which the difficulty arises, they would readily understand that the sale of those drills with no efficient stirring mechanism must be seriously affected. Instead of stopping at frequent intervals, the farmer may detail a boy to follow the drill, and, as often as the delivery from a coulter ceases, to open the lid and stir the manure overlying the feeder running idle. But this means extra labor; it is really going back to detailing a man and a boy to work a drill instead one man alone. Some of the artificial manures, *e.g.*, clean bonedust, are delivered readily enough without a stirrer, and even superphosphates when dry enough give little trouble, and therefore the stirring apparatus should be so fixed that it may be worked in the drill only when necessary. It will be well if drillmakers and their agents will note the defect in their drills, so that it may be remedied in next season's implements.



Some farmers in their perplexity have had recourse to measures fearful and wonderful from the manure manufacturer's point of view, to "dry" the manure difficult to distribute. Quicklime, wood ashes, &c., have been mixed with superphosphate with cool carelessness of the consequences of such substances being mixed. To many it does not seem to have occurred that quicklime and superphosphate, from the farmers' point of view, should be considered incompatibles—that the addition of lime to the superphosphate is one of the most effective means possible to lessen the solubility of the phosphate, and undo the work of the manufacturer. No doubt, when applied to the land, the superphosphate comes in contact with lime (carbonate of lime) in the soil, and gradually goes back to tricalcia or tricalcic phosphate; but this will come soon enough, and cannot be avoided. To mix lime and superphosphate on a barn floor, and allow the mixture to lie that the whole may "dry," is a blunder, greater or less, according to the quantity of lime used or the time the mixture is allowed to lie. If something must be mixed with the superphosphate to "dry" it, then gypsum should be used. Ground gypsum is better than calcined for this purpose. Some farmers have informed me that they can secure uniform delivery by mixing superphosphate (properly so called) with guano superphosphate; but this can be done with only some of the superphosphated guanoes. However, there can be no objection to mixing two superphosphates further than the labor required to mix them.

Some farmers will do well now to sow in beds Jersey kale seed for transplanting later when opportunity offers.

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## LIVE STOCK NOTES.

BY C. J. VALENTINE, CHIEF INSPECTOR OF STOCK.

The general fall of rain over the lower north and southern portions of the colony, also the light rains in the outside areas, will no doubt have a perceptible effect upon the health of stock throughout the country. The severe seasons through which the country has passed have caused very serious losses to our farmers. The losses of milch cattle have been most marked, and there seems to be a probability of the supply of milch cattle being seriously affected. Greater care should be exercised in providing and saving food for stock, and all those who can save and keep their well-bred promising heifer calves should do so. Never has there been a greater want in the country for good milch cattle, and the increase in the dairying industry points to there being a demand for the next few years. The long drought, the deficient pasturage of a nutritious character—from neglect of a proper course of treatment of our pasture lands—is having a most marked and deleterious effect upon our stock. Farmers must recognise that if they wish to raise sound, healthy, paying stock, attention must be given to the improvement of their pasture and the feeding of their young animals. Pasture lands must be manured as well as wheat land, and they must be treated with both phosphatic and nitrogenous manures.

The complaints which have carried off so many of our cattle have not been contagious, but principally diseases of the digestive organs, causing impaction, asthenic apoplexy, acute indigestion, ænemia, and redwater. The number lost from contagious disease has been small—cattle which were quarantined on account of an outbreak of pleuro-pneumonia have been released—the deaths on the whole being a small percentage. Tuberculosis has carried off a few cattle, but owners are now more on the alert, and more care is taken in at once isolating and notifying the stock inspectors; but with too many there is still an inclination to conceal disease. In sheep in some parts there is, unfortunately, an increase in the number affected with lice, which have as bad if not worse an effect on the fleece than scab. The dip for lice should be stronger than for

tick, and frequently owners have to dip twice in the season. The inspectors' notes show one owner has been fined £5 and costs for not giving notice of his sheep being affected, and another for having exposed affected sheep for sale in a public market. Strangles has made its appearance in the Central North, and a number of cases have been reported, but fortunately, so far, it is not of a malignant character. Isolation and careful treatment with disinfectants is the best course to pursue. A small number of sheep illegally landed at Port Adelaide from a vessel were seized, and the owners fined. Supplies of cattle from Queensland are again coming forward, whilst our northern runs are still forwarding useful fats to our markets.

## POTATOES.

At the Ontario Experimental Farm, Canada, numerous experiments in the cultivation of potatoes have been carried out during the past six years, and the following is a summary of the principal results arrived at:—

*Depth of Planting.*—During six years, eighteen tests in all with potatoes put in 1in., 3in., 5in., and 7in. deep, were conducted, the average of the whole period being that those planted at 5in. yielded over 5bush. per acre more than at 3in., 9bush. more than those planted 1in. deep, and over 13bush. more than at 7in. In 1896 the yield from potatoes planted 1in. deep was better than any of the others, but for the first time during the trials. This was due to the fact that the summer was exceptionally favorable as regards showers of rain, there being no period in which the crops suffered to any extent from want of rain, and those nearer the surface got the most benefit from the rain that fell. From these results the conclusion to be arrived at is that potatoes planted not less than 3in. deep, or more than 5in., give the best results.

*Seed.*—Experiments with different kinds of seeds showed that the highest yields during the whole period were obtained from large whole potatoes planted 1ft. apart in the rows, medium-sized whole potatoes coming next; but when the quantity of seed used is deducted, the medium-sized potatoes come first with an average of 176bush. per acre, small whole potatoes next with an average of 172bush., while the large whole potatoes come third from the lowest yield. The highest percentage of marketable potatoes was obtained from medium-sized potatoes cut to two eyes, and the largest from large whole potatoes. The highest return of marketable potatoes was, however, obtained from small whole potatoes planted 1ft. apart in the rows, the average for five seasons being 152½bush. per acre, while medium whole potatoes came next with an average of 146bush. of marketable potatoes per acre. When cut setts were tested it was found that much more depends upon the size of the setts rather than upon the comparative number of eyes in the sett. The smaller the sett the smaller the yield of large potatoes. It was also found that planting the setts immediately after cutting was much better than preparing the setts several days beforehand, the results being remarkably uniform in all the tests. Freshly-cut potatoes sprinkled with plaster of Paris, and kept several days, gave a much better yield than setts treated with lime or left untreated. Setts with one eye cut from the middle portion of the potato gave slightly better results than single eye setts from the seed end, and better still than from the stem end, but the difference was but very little, not more than 3 per cent. between the highest and lowest. In these experiments the rows were about 27in. apart.

*Methods of Cultivation.*—In 1896 experiments were tried to find the best distance apart to plant setts. With drills 26½in apart with potatoes 12in. apart in the rows the yield was 184½bush. per acre, the highest average and the greatest percentage of marketable potatoes. Plots left flat produced on an average 6bush. per acre more than the plots which were hilled.

## INSECT PESTS AND SPRAYING IN VICTORIA.

BY A. B. ROBIN, NURIOOTPA.

When visiting several of the principal fruit-growing districts near Melbourne recently, I was somewhat surprised at the extent to which insect pests of numerous varieties have spread; some of the worst, such as the apple-root borer, pear and cherry slug, &c., being unknown on our side of the border. The appearance of the orchards presents very striking contrasts, reflecting either the care and skill or the reverse of the growers; but the careful and intelligent ones are more or less handicapped in their efforts to combat their minute foes by the negligence of others. Many of the gardens in or adjacent to the suburbs were sold during the land boom for speculative purposes, and being neglected ever since have become a constant source of infection. The Victorian Government, however, have recently appointed six inspectors to enforce the regulations under the Vegetation Diseases Act, so that there will no doubt be a considerable improvement shortly in the condition of the orchards and private gardens. Spraying does not appear to be so general as in South Australia, but in many instances it is carried out more efficiently, and at less expense. In the treatment of scale insects, especially red scale (*Aspidiotus coccineus*) and mussel scale (*Mytilaspis pomorum*), which are very prevalent, also of peach aphid, the new patent kerosene amalgamator is being used with very successful results. This apparatus consists of a brass tube, one end of which is screwed on to a tap connected with a Doncaster spray pump, and fitted with a wheel valve for regulating the proportion of kerosene. The other end is bent round and inserted into a vessel containing kerosene, which may be fixed to the side of the pump vat. By this means kerosene and water from the vat are pumped up at the same time, and by the action of the plunger become thoroughly amalgamated under great air pressure. It can be detached from the pump when not required, or may be used in connection with other mixtures. The kerosene amalgamator has many advantages over kerosene emulsion, resin wash, or other insecticides. It is more economical, no time is lost in preparing the mixture, the pump cannot get clogged, and whilst its insect-destroying power is greater, it is quite harmless to vegetation. It is stated that even the eggs of insects can be destroyed by using a proportion of one part kerosene to ten of water, but it is only safe to use this strength during winter on deciduous trees. The kerosene attachment was invented and patented by Mr. Sydney Williams, of Doncaster; the price is 30s. in Melbourne. The Doncaster spray-pumps appear to be very popular amongst Victorian growers, and are also coming into favor in New South Wales and Tasmania. I was afforded an opportunity of seeing them tried with the kerosene attachment by the manufacturer, and noticed many improvements on the old style. These pumps are made of three sizes—1½ in., 2 in., and double-acting 2 in., the latter being mounted on an 80 gall. vat, and provided with two quintuple nozzles. Being made of gun metal they are strong and durable, and having a large air-chamber throw out a powerful and continuous spray. At the same time they can be worked easily by a boy. For the handle a long balance lever is used, weighted at one end. The spray directors consist of long iron tubes, with valves at the lower end, so that the spray can be turned off instantaneously without lowering the nozzle. The pumps are fitted with both jet and motion agitators for keeping Bordeaux mixture, Paris green, &c., well stirred. The capacity of the largest size is said to be about eight acres of large trees per day. The smaller Doncaster bucket-pumps on carriers are well adapted for small gardens or hilly country where it is impossible to use a horse and dray.

The splendid twenty-six acre lemon plantation of Mr. Williams, at Doncaster,

twelve miles from Melbourne, affords a good object lesson, showing the efficacy of the kerosene and water treatment. A few years ago the trees were badly affected by both red and black scale, and had become unprofitable; but by systematic spraying these pests have been eradicated, and the orchard is now one of the show places of the colony. The trees are sprayed thoroughly two or three times during the season, the cost being estimated by Mr. Williams at 4s. 6d. per acre for each spraying. The rest of the orchard, which contains about seventy-two acres altogether, is kept in healthy condition, although surrounded by others in which insects and fungi seem to have the upper hand of the owners.

One of the most destructive pests in Victoria is the apple-root borer (*Leptops hopei*). It resembles and is closely related to a beetle (*Leptops robusta*) which is common in South Australian gardens. The latter, however, is practically harmless, as it appears to confine its attention to fallen fruit. The former, on the other hand, has caused the destruction of many thousands of apple and pear trees by boring in their roots. The larvæ of these beetles can be destroyed to some extent by inserting bisulphide of carbon in the soil around the trees, but a very simple and effective remedy has lately been discovered. It consists in placing a zinc band around the stem of the tree, which prevents the beetles crawling up to deposit their eggs. They can then be caught in large numbers whilst clustering below the band. The codlin moth is widely distributed as in all the other colonies. Several of the largest growers spray their trees with Paris green, and are evidently satisfied with the results. In some of the apple-growing districts, where the land is not all cleared of scrub, it is certain that these pests are kept in check by native birds, woodpeckers, and a small brown bird known locally as the "chow-chow," being particularly useful in this respect. In the interests of the farmer or fruit-grower, as well as of the community in general, it is important that the rising generation should be taught to regard insectivorous birds as sacred.

## GOOD PEACHES FOR SUCCESSIONAL CROPPING.

BY H. WICKS, RIVERSIDE NURSERY, PAYNEHAM.

It being possible by selection of suitable varieties of peaches to have this delicious fruit ripening from early in December till the end of March, I have, at the request of the Editor, made the following selection of the best varieties for this purpose, mentioning them in their order of ripening. Unless otherwise stated, the varieties are freestone.

**BRIGGS' RED MAY, HIGH'S EARLY CANADA, ALEXANDER'S EARLY.**—Medium to large, roundish, highly colored with shades of light and dark red, ripening from about 10th to 25th December. These are about the best very early varieties we have. Saunders, Waterloo, Amsden's June, Wilder, and others ripen about the same time, are much like the others, and if equal to them are certainly not better. These very early varieties all have the same fault, *i.e.*, drop their fruitbuds very badly in some seasons, and for which no remedy is known.

**EARLY RIVERS.**—Large, roundish oval, skin delicate cream color, with a very beautiful light red cheek, where exposed; it follows the first early sorts, and will pay to grow if near the market or for home consumption, but not otherwise, as it is too soft for packing, bruising very easily; it sometimes cracks at the stone. This variety is often sold as Early Silver.

**HALE'S EARLY.**—Large to very large, roundish, beautifully colored with light and dark red, follows Early Rivers. This variety also loses its fruitbuds in certain seasons.

**MOUNTAIN ROSE, ROYAL GEORGE.**—Two first-class mid-season peaches, both well colored, but in my opinion Mountain Rose is the better, the colors being richer, a point in its favor for marketing, and flavor and cropping qualities quite equal to Royal George.

**ROYAL GEORGE CLING.**—In appearance much like the freestone of same name, and ripens at same time.

**EARLY CRAWFORD, FOSTER.**—Two first-class yellow-fleshed varieties, ripening mid-season; color, crimson and gold; good bearers; fruit large to very large; good for market, canning, and drying.

**MUIR, ELBERTA.**—These ripen just after the foregoing. Muir is a large roundish oval fruit, yellow to the stone, bears well, and is good for market, canning, and drying. Elberta is a remarkably handsome peach, good quality, color, crimson and gold; will be largely planted when better known.

**RIVERS' SEA EAGLE.**—Fruit very large, round, cream color with red cheek; a very beautiful fruit; ripens early in February; a very heavy bearer, and good market variety.

**NICOL'S ORANGE CLING.**—Large fruit, colored like Crawford, ripens about 7th to 14th February, one of the best clingstone peaches we have.

**CHINESE CLING.**—Large, almost oval, skin cream with pinkish cheek. A delicious cling of high quality, ripening in February.

**LADY PALMERSTON.**—Medium to large, very handsome yellow-fleshed variety of good quality, very highly colored with red, very heavy bearer, and good for canning and market.

**COMET.**—Seedling from Salway, which it resembles in shape and color, but is rather smaller, and fourteen days earlier.

**SALWAY.**—Very large, skin yellow with red cheek, ripens from middle to end of March, good market and canning variety.

**LATE RED ITALIAN CLING.**—Large to very large, red, tree strong grower, good bearer; good stewing variety.

The following varieties will be largely planted when better known:—Shepley's Late Red, Silver Medal, Campden Superb, and Brandywine; all good market varieties.

Elberta, Sea Eagle, and Chinese Cling are very subject to curl-leaf in bad seasons.

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**LIME, SALT, AND SULPHUR COMPOUND.**—This is used to destroy eggs of insects, red spider, and San Jose scale, and should only be applied when there are no leaves on the trees. Take new unslacked lime, 40lbs.; sulphur, 20lbs.; salt, 15lbs. Then slack 10lbs. of the lime and boil with the 20lbs. sulphur in 20galls. water for three hours over a brisk fire. Then slack the remaining 30lbs. lime, add it to the boiling mixture, put in the salt, and boil for thirty to sixty minutes, and add enough water to make up to 60galls. The 10lbs. lime and sulphur should show a deep amber color when boiled long enough. Before using, strain through a very fine wire sieve, and whilst spraying, keep the mixture well stirred.

**A SILLY SCARE.**—There can be no danger from eating fruit that has been sprayed with arsenious compounds as recommended by the Agricultural Bureau. Only one part in 7,000 of the spray consists of arsenic, and nothing like 10 per cent. of this attaches to the fruit, and nearly every particle of that small portion is blown away or washed away during the last month or two after the latest spraying, before the fruit is ripe enough to gather.

## SPRAYING TESTS FOR CODLIN MOTH.

By GEORGE QUINN, INSPECTOR OF FRUIT.

Acting under instructions from the Minister of Agriculture, in September last I secured from Mr. A. Quick, Brookside, Marion, control of a block of apple and pear trees in his orchard, for the purpose of testing in a practical manner the efficacy of arsenical sprays for the destruction of codlin moth caterpillars.

The block secured is about 480ft. long by 200ft. wide. The soil of the eastern half is poor, consisting of a large percentage of broken shaly gravel, intermingled with a somewhat indifferent loam. The lower and western portion is a much better soil, and its position ensures the ground receiving a good soaking in winter, when an adjoining watercourse is turned into the orchard.



1. Pear trees sprayed five times with Paris green.

The trees were planted about sixteen years ago, and are of medium size. They are planted 20ft. apart on the "Square" principle. Grape vines are growing in the spaces between the trees of each row. There are 185 apple and seventy-four pear trees, comprising eighteen varieties of the former and nine varieties of the latter, growing upon the block.

The extraordinary drought of last summer, following upon several dry winters, had a very destructive effect upon a large portion of the trees in the block, and it was only upon those growing in the lower half that had felt the influence of the winter irrigation that the fruits reached a high standard of excellence. The crop borne upon the trees as a whole was patchy, and below

the average in quantity, quality, and size. Some of the trees set their fruits so thinly that I had the few fruits gathered, as I did not consider such small numbers worth spraying. (See blocks 1 and 2.)

Owing to a misunderstanding, the trunks of the trees were not scraped clean of all loose dead bark until November 11, when I observed that most of the pupæ which had developed from the hybernating caterpillars hidden there had changed to moths and escaped.

The soil had received the ordinary winter ploughing, and had afterwards been harrowed down to a fairly fine tilth in the spring.

On November 25, several larvæ nearly full grown were found in some of the fruits. The tree stems were bandaged at once, and these bands were afterwards removed and examined each week until May 6, when they were finally removed, as the fruits had all been gathered a couple of weeks before that date. The larvæ found in and beneath these bandages were all counted and destroyed. A careful note of the number of larvæ found at each examination and on the trees of each row was recorded.



2. Apple trees next row to block 1 not sprayed.

The fallen fruits were carefully collected twice each week from the beginning of December until they were all harvested. A close examination was made of every fruit to determine the infested ones. This scrutiny was performed in a very convincing manner, every doubtful fruit being dissected so that a correct conclusion could be formed. It is needless to say that this work occupied much time, and was of an exceedingly tedious and trying character during the hot weather.

The block, as seen by the accompanying rough sketch, was divided up into sections, with a view to including as many varieties of apples and pears as possible in each section to be treated in a certain manner. As far as the cultivation, cleaning stems, bandaging, and gathering the fallen fruits were concerned, each section was treated alike. The majority of the sections were sprayed with either Paris green in limewater or white arsenic dissolved by sodium carbonate in limewater, at such times as set out in the table opposite sketch plan. The first spraying was given to several Jargonelle pear trees on October 15, as these were ahead of the other varieties, the petals having all fallen from the

blooms by that date, and the calyx leaves of the small fruits were closing together. The first general spraying was begun on October 25, when the petals were shed from the majority of the flowers of the trees. These regular sprayings were continued at fortnightly intervals afterwards, until the numbers of sprayings set opposite to each section or row in the adjoining lists had been applied.

The Paris green used was manufactured by Blundell, Spence, & Co., and to secure an even analysis I had fourteen 1lb. packets passed through a hair sieve, and a sample taken from the bulk. The Government Analyst (Mr. G. A. Goyder) declared the sample to contain 43.5 per cent. arsenic and 24.5 per cent. copper, being, in his opinion, a compound of reasonable purity. This arsenite was weighed up into 3oz. packets, one packet being used in each 30gall. spray pump tankful.

The practice followed in mixing was to place the contents of the packet into a basin containing a small quantity of fresh limewater, and mix to the consistency of a very thin paint. The limewater used in spraying was made by placing a certain number of pounds of fresh lime into a barrel, slaking it with a small volume of water, and when slaked more water was added until the barrel contained 1gall. of water for each pound of lime. Before using the limewater the contents of the barrel were stirred thoroughly, and the liquid strained through a piece of bran bagging into a 4gall. bucket. This bucketful of limewater was then poured into the spray-pump tank, and 26galls. of clean water added from the tap to complete the 30galls. of wash. Into this the 3oz. of liquefied Paris green was poured, and as the contents were kept in a state of constant agitation by the automatic stirring apparatus attached to the pump, the wash was ready for applying. A fresh packet of Paris green was liquefied as described above, and allowed to remain in 4galls. of limewater until the former tankful was sprayed. This precaution was taken to ensure a more perfect neutralisation of any acid qualities than could be obtained by at once placing the Paris green into the larger and more dilute limewater mixture in the tank.

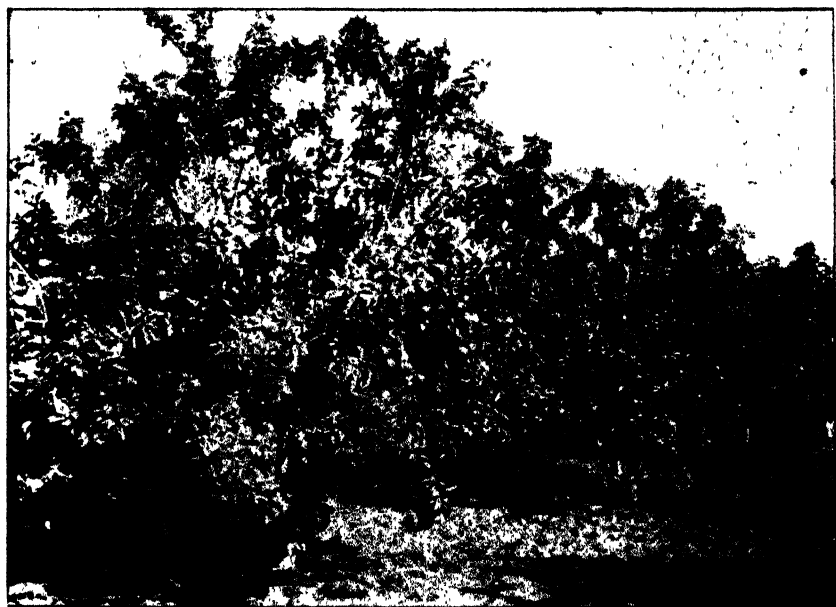
The arsenite of soda was made in the manner suggested by Professor Kedzie, of Michigan Experimental Station, U.S.A. One pound of white arsenic and 2lbs. sodium carbonate (S. crystals) were placed in 1gall. of water and boiled until the whole contents went into solution. This solution, which is almost colorless, was used at the rate of three-quarters of a pint to each 30galls. of limewater; 8galls. of strong milk of lime being added to 22galls. of clean water; the solution of arsenic being in each instance poured into the strong limewater (8galls.) at least half an hour before being diluted further in the tank for spraying. If the contents of these two spraying compounds, used in the proportions given herein, be studied, and allowance for losses of arsenic in the process of manufacture of the arsenite of soda be considered, it will be seen that the percentages of poison contained in each gallon of spray wash are about equal.

These compounds were sprayed upon the trees during both cool and hot sunny weather—on several occasions the temperature being over 100° F. in the shade—without the slightest injury to the foliage (see block 3). The trees were sprayed thoroughly, special care being taken to envelop the fruits in the misty spray. The pump used was of local manufacture, and, although it had been in use for three seasons, not five minutes' delay was caused by any failure of the implement during eleven days' hard spraying. It was carried between the rows on a light spring dray, one man driving the horse and working the pump, while two men, each with a double cyclone nozzle attached to 30ft. of  $\frac{1}{2}$ in. indiarubber hose, sprayed a row on their respective sides of the vehicle. It must, however, be understood, when calculating the time occupied, that the second hose was only in use about half of the time.

There can be little doubt that the severity of the season has militated against the absolute character of the results obtained. The prolonged drought left the



trees on the upper portion of this block in such straits for want of moisture that the fruits on many of the trees, both in sprayed and unsprayed sections alike, reached only one-third or half their normal sizes, the foliage also being very poor (see blocks 1 and 2). The result of this was that very much of the fruit became quite unfit for market purposes, which in every-day use would lessen the returns to be set off against the expenditure. It is also argued that the pulp of small-stunted fruits is not of a consistency suitable for the rapid development of the larvæ of codlin moth, and, again, there is a general opinion among fruitgrowers that the extremely high temperatures which ranged during December, 1897, and January and February of this year on the plains around Adelaide have exercised a very repressive effect upon the usually numerous and most destructive second brood of this insect. Whatever force there may be in the latter contention, a glance at the tabulated results obtained in rows 9 and 10 (each of which contains exactly the same varieties and number of trees of those varieties) will show that the spraying of the former row with



3. Cleopatra apple trees, western end of block, sprayed seven times with Paris green.

Paris green five times had a saving effect to the extent of 16 per cent. more of the fruit than on row 10, where bandages alone had been used.

The difference between the percentages of sound fruit upon the trees in rows 11 and 12—the former only bandaged and the latter treated with Paris green four times—shows results in favor of the sprayed trees to the extent of 43 per cent. more sound fruit.

The high percentages of infested fruits borne upon rows 21 and 22, which were left unsprayed, as compared with the rows treated on either side of them, show that fruits of the most stunted size and quality in the block were freely attacked by the larvæ when left untreated.

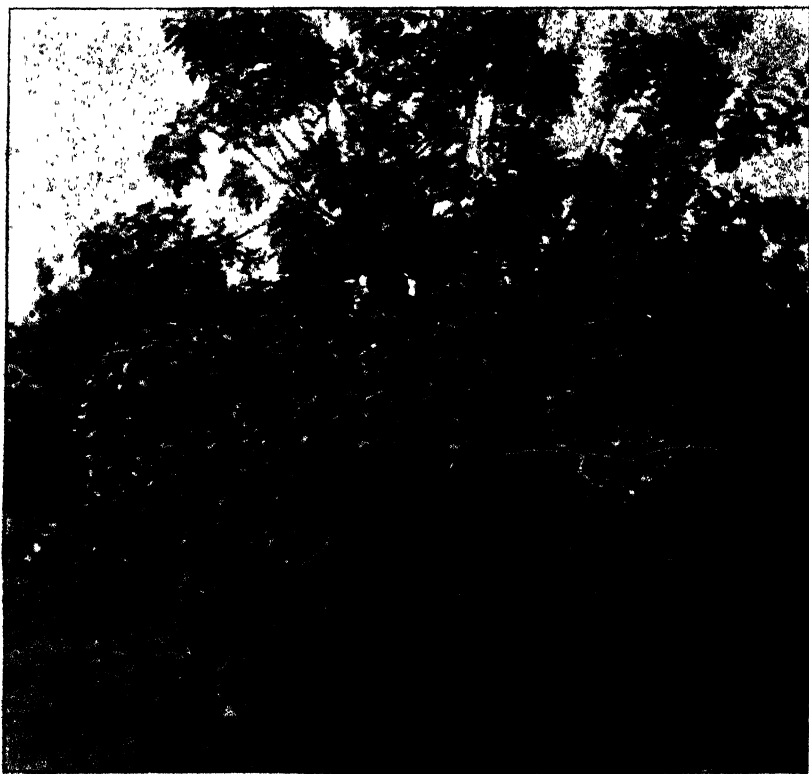
It will be noted that the percentage of infested fruits is higher upon those rows immediately adjoining the unsprayed rows, also that in those western rows nearest—divided by a path only—to the old orchard, containing many old and badly-infested trees, the ravages of the pest were most severe. It would seem

that the unsprayed rows had exercised a baneful influence upon the adjoining rows that were treated, and it would be interesting to know—if it were possible—to what extent the sprayed sections exercised an influence for the saving of fruit upon the unsprayed rows.

The discrepancy existing between the total number of the larvæ caught in the bandages, viz., 2,738, and the total number of infested fruits, 12,891, is an interesting cause for investigation; but it may be partly explained by the fact that the frequent collection of the fruits caused great numbers of the larvæ to be destroyed ere they escaped from the fruits. This I know to be a fact, as the regular dissections of the fruits frequently revealed the presence of the caterpillars within them. Again, the rows of old vines between the trees no doubt afforded refuge for vast numbers. No natural insect enemies could be found attacking the caterpillars, but a great many "sugar" ants were constantly crawling upon the trees, but in no instance were they observed attacking the uninjured larvæ of their own accord.

The comparative values of Paris green and arsenite of soda for destroying codlin moth larvæ, as far as these experiments show, seem very even; but 320 galls. of wash of the former costs 4s., against 1s. 6d for the same quantity of the soda compound. This is an important side for the large grower to consider.

In the matter of the application of these sprays, microscopic examination of the sprayed fruits as soon as the Paris green liquid has dried shows clearly that



4. Cleopatra apple tree from row (block 3) sprayed seven times with Paris green. Photograph taken on March 6, showing crop of fruit.

the common practice of drenching the trees, as is done when using insecticides that kill by contact, is a gross mistake, for the heavy copper compound runs into globules and drops from the lowest point of the fruits to the ground, and the granules of Paris green can only be detected where these globules have congealed and dried.

If a rapid-misting spray be used, and care taken to wet the fruits over with fine particles only, turning away the nozzles ere the liquid is thrown on in sufficient quantities to cause it to run together and drip from the fruits, examination shows that almost every minute misty particle has held its grain of Paris green until it evaporated, leaving the poison finely distributed over the surface of the fruit. This method also possesses the advantages of saving both time and wash to the extent of one-half.

The soda compound being in almost complete solution, may be sprayed on to a drenching point, though this is an unnecessary waste of time and material, as every atom of the liquid is poisoned, which, when the moisture evaporates, is left upon the surface reached by the spray.

The weather experienced during the continuance of these tests was highly favorable to spraying. Winds were light, and rain almost entirely absent.

Samples of the latest fruits gathered in April, specially selected as showing strong traces of the wash upon them, were submitted to the Government Analyst with the request that he would inform me what quantity of such fruit could be eaten by a human being without fatal effects. The analyses resulted in the Analyst giving me the assurance that, although traces of arsenic were found after very careful tests, the quantities found were so minute that no injury would accrue if such fruits were used exclusively for food.

It may interest students of the habits of codlin moth to know that, although in the weekly examinations of the bandages occasional pupæ were found, in no case were pupæ cases from which moths had emerged found.

#### *The Cost of the Experiments.*

The estimated cost of these tests was £25. The following shows the actual expenditure :—

	£	s.	d.
To Spraying—Two men 11 days, 1 man $\frac{1}{2}$ day, at 8s. per day .....	9	0	0
Hire of horse, cart, and spray pump, $1\frac{1}{2}$ days at 8s. 6d. per day ....	4	17	6
Cost of spraying materials .....	1	5	$7\frac{1}{2}$
Cost of spraying and bandaging appliances, &c. ....	3	7	11
Collecting infested and fallen fruits and examining bandages—One lad 66 half-days, at 1s. 9d. per day .....	2	17	9
Analyses of Paris green and sprayed fruits .....	1	7	0
Total .....	£22	15	$9\frac{1}{2}$

There is no doubt this is a very high expenditure for the treatment of a little over two acres of orchard; but it must be borne in mind that I had to pay 8s. per day for eight hours' labor, which Mr. Quick assures me is just double the amount it would cost him for capable young men, who are paid 5s. per day for ten hours' work. The cost of keeping a horse, and the wear and tear of a cart and spray pump, would not reach 8s. 6d. per day. The sum set down for appliances refers to the purchase of barrels, spraying hose and nozzles, bandages, &c., all of which last for several years, and are not a fair charge on one season's work; and, finally, it may be noted that the results appear very little better from the rows sprayed seven times than from those rows which received five treatments of the same wash. This points to a possible reduction in the cost.

Finally, I desire to thank Mr. Quick for placing the trees at my disposal, and to Mr. Summers, of the Central Agricultural Bureau, for assistance so intelligently rendered to me at a very busy time.

*Spraying Tests for Codlin Moth.—Rough Sketch of Experimental Plot.*

Path separating plot on west side from garden containing numbers of old infested apple and pear trees.		No. of Row.
2 Lord Suffield, 6 Dumelow,* 1 Bartlett pear,* 2 Cleopatra . . . . .	Path separating plot on north side from small gardens containing pear trees infested by codlin moth.	1
2 Lord Suffield, 3 Quarrenden,* 3 Dumelow,* 3 Five Crown* . . . . .		2
2 Lord Suffield, 2 Scarlet, 7 Cleopatra . . . . .		3
8 Cleopatra, 1 Bartlett pear,* 1 Rome Beauty,* 1 Unknown* . . . . .		4
10 Cleopatra, 1 Bartlett pear* . . . . .		5
8 Cleopatra, 2 Lord Nelson* . . . . .		6
10 Cleopatra, 1 Bartlett pear* . . . . .		7
11 Cleopatra . . . . .		8
4 Irish peach, 3 Cleopatra,* 4 Cellini* . . . . .		9
4 Irish peach, 3 Cleopatra, 4 Cellini . . . . .		10
5 Unknown, 5 Scarlet,* 1 Bartlett pear* . . . . .		11
4 Unknown, 1 Irish peach, 2 Bartlett pear, 3 Scarlet . . . . .		12
6 Ribston, 1 Pear, 4 Glou Moreceau pear . . . . .		13
6 Ribston, 1 Pear, 2 Glou Moreceau pear . . . . .		14
3 Cleopatra, 1 Mobbs, 1 Pear, 1 Bartlett pear* . . . . .		15
3 Unknown,* 2 Mobbs, 1 Bartlett,* 1 Pear, 4 Vicar pear . . . . .		16
4 Unknown,* 1 Bartlett,* 1 Mobbs, 1 Jargonelle pear, 4 Vicar pear . . . . .		17
3 Cleopatra, 1 Mobbs, 1 Bartlett,* 1 Jargonelle pear, 4 Vicar pear . . . . .	Path separating plot on north side from vineyard.	18
3 Ribston, 2 Bartlett pear,* 1 Mobbs, 1 Jargonelle, 4 Bartlett pear . . . . .		19
2 Ribston, 1 Astrachan, 1 Bartlett pear,* 1 Mobbs, 1 Jargonelle pear, 4 Bartlett pear . . . . .		20
3 Astrachan,* 3 Mobbs, 1 Jargonelle pear, 4 Bartlett pear . . . . .		21
3 Gravenstein, 3 Mobbs, 2 W. Nelis pear, 2 Josephine pear, 1 Unknown pear . . . . .		22
3 Carolina, 3 Cleopatra, 1 Pear,* 2 W. Nelis pear, 2 Josephine pear . . . . .		23
2 Carolina, 1 Astrachan, 3 Cleopatra, 2 Pears, 1 Jargonelle, 1 W. Nelis, 1 Josephine pear . . . . .		24
6 Late Kitchen pears, 5 Apricots . . . . .		25
Mixed garden—Apricots and vines . . . . .		—

\* Young trees not bearing; planted to fill gaps. Where kind of fruit is not stated, the varieties are apples.

Plot is, approximately, 480ft. long by 200ft. wide.

ABBREVIATIONS.—Apples—Dumelow, for Dumelow's Seedling; Scarlet, for Scarlet Non-paroil; Ribston, for Ribston Pippin; Carolina, for Carolina Red June; Mobbs, for Mobbs Royal. Pears—W. Nelis, for Winter Nelis; Vicar, for Vicar of Winkfield; Josephine, for Josephine de Malines.

*Spraying Tests for Codlin Moth.—Statement of Results.*

No. of Row.	How Treated.	Number of Fruits Gathered.	Number Infested.	Number Clean.	Per cent. of Fruit Infested.	Larvæ Found in Bandages.
1	7 times with Paris green .....	2,345	663	1,682	29	154
2	7 times with Paris green .....	1,606	430	1,176	27	153
3	7 times with Paris green .....	2,595	537	2,578	17	107
4	7 times with Paris green .....	4,259	597	3,662	14	119
5	7 times with Paris green .....	3,117	358	2,759	11	112
6	7 times with Paris green .....	2,570	324	2,246	13	131
7	7 times with Paris green .....	1,932	215	1,717	11	92
8	5 times with Paris green .....	1,648	217	1,431	13	115
9	5 times with Paris green .....	2,252	486	1,766	22	113
10	Not sprayed .....	3,641	1,356	2,285	38	161
11	Not sprayed .....	3,022	1,765	1,257	59	190
12	4 times with Paris green .....	3,828	594	3,234	16	153
13	5 times with Paris green .....	8,209	340	7,869	4	128
14	4 times with arsenite soda .....	5,678	342	5,336	6	117
15	5 times with arsenite soda .....	1,502	127	1,375	9	32
16	5 times with Paris green .....	5,148	149	4,999	3	63
17	1 times with Paris green .....	3,948	205	3,743	5	79
18	6 times with Paris green .....	5,528	255	5,270	5	87
19	5 times with arsenite soda .....	7,110	199	7,011	3	64
20	5 times with arsenite soda .....	6,687	459	6,228	7	71
21	Not sprayed .....	4,682	1,683	2,999	36	181
22	Not sprayed .....	2,256	948	1,308	42	98
23	6 times with Paris green .....	2,116	167	1,949	8	57
24	6 times with Paris green .....	3,634	234	3,400	7	78
25	6 times with Paris green .....	3,454	238	3,216	7	83
—	—	—	—	—	—	—

## SUMMARY OF ABOVE.

Seventeen rows sprayed with Paris green bore 58,719 fruits, of which 6,012 were infested, and 52,707 clean. Percentage of infested fruit, 10·3.

Four rows sprayed with arsenite of soda bore 21,077 fruits, 1,127 of which were infested, and 19,950 clean. Percentage infested, 5·3.

Four rows not sprayed bore 13,601 fruits, of which 5,762 were infested, and 7,849 clean. Percentage of infested fruit, 42·3.

Total number of caterpillars caught in bandages, 2,738.

## ORCHARD NOTES FOR JUNE

BY GEORGE QUINN, INSPECTOR OF FRUIT.

Good soaking rains and mild sunny days have alternated over the greater part of our orchard lands in this colony during the last month. The ground is in a suitable condition for working now, and no time should be lost in throwing it open by ploughing deeply, so that the soil may absorb every drop of moisture. If the subsoil be fairly well drained, or an effective system of artificial drains be used, no fear need be entertained of any ordinarily situated orchard in this province receiving too much moisture.

I desire to again draw attention to the arguments used in last month's notes in favor of deep early winter cultivation.

Pruning deciduous trees will be in full swing during June, and in those orchards where the trees have made little growth during the past season hard pruning is the only remedy that suggests itself to cause the trees to make a strong fresh start. I know this will not meet the approval of many growers, but we cannot get away from the fact that when the vitality of a tree is reduced to a low ebb strong growth is impossible from a vast number of buds, so that if we reduce the number of buds within reason the strength of the shoots coming from the fewer buds must be greater. Growers of vines will see my somewhat badly expressed idea, by knowing that in their practices weakly vines or shoots are cut back more, and a lesser number of buds left than on strong vines or shoots.

Plums and apricots will be the sorts pruned first, and I would suggest to growers of the former not to be afraid to cut young trees severely. The plum tree will force out spur growths along a greater length of a vertical shoot than probably any other fruit tree. The result of this will be that if the young trees are not pruned heavily during the first three or four years, the abundance of fruit produced on these spurs will be out of proportion to the strength of the shoots carrying the fruit spurs, and all sorts of propping devices will be required to prevent the splitting away of limbs. Under ordinary conditions the plum tree requires to be pruned less and less each year when the tree has been stoutly framed. Most varieties have habits of growth peculiar to themselves, and these must be studied in shaping the young trees, as those with sprawling habits should be encouraged to go up straight. The Golden Drop may be instanced as illustrating this section.

The French prune takes almost the symmetry of the Cypress, and this should not be interfered with, while the American cherry plum will grow to an enormous height if not spread out artificially by pruning.

Apricots as a rule receive hard pruning, and this season particularly they will require it. The successful and consistent cropping of apricot trees depends largely on the skill of the pruner, who should aim at keeping this point in mind, that upon the growth made from the effects of his pruning this season will depend the quantity and location of the fruit crop of the following year. Someone may say this is indefinite, but when writing on a subject in a general way one cannot state how much to cut off or what lengths to leave on. The pruner should note the growths of his trees, and he will see then almost exactly how much of the previous year's growth can be left on, so that pretty well all the buds are forced into active growth, either as leading shoots—generally three with the apricot—or as fruit-bearing spurs.

Now is a good time to apply coarse slowly dissolving manures, such as bone-dust or slaughter-house refuse, for reasons advanced last month.

The orange harvest is just on us, and the shortage in the crop will soon make itself felt. It is really astonishing how the citrus trees have recovered them-

selves from the severe effects of the climate upon them earlier in the year. The growers will not require to look to outside or European markets to secure fair prices this year. The red scale does not seem to have spread on to the fruits so badly during the past summer, the high dry temperatures, no doubt, having had a repressive effect upon the young tender larvæ.

During the last few seasons I have made constant inquiries, and noted the times at which most orchardists have applied Bordeaux mixture to fruit trees for the repression of apricot shothole, peach curl blister, and apple and pear scabs (*Fusicladiums*), and find that there is great unanimity among them that very little is gained by early winter spraying—that is immediately after pruning—but that uniformly good results have followed strong applications just as the buds are bursting in early spring.

All bandages should be removed from the stems of trees that have borne fruits infested by the larvæ of codlin moth. The bands should be burnt or disinfected in sulphur fumes in a close box, or dipped in boiling water.

If any loose, dead bark is upon the stems or limbs of such trees it should be scraped off and burnt, and great care should be taken in scraping out crevices on those parts of the stems that have been covered by the bandages; all broken rough ends or knotholes should be cut away cleanly or scraped out to destroy hybernating caterpillars.

The stems of plum trees should be carefully examined for boring caterpillars before they do much injury or penetrate into the woody portion of the limbs. Owners of old broken stemmed apple or pear trees will do well to grub them out, and after applying some good manure to the soil young trees could be planted; but it is not courting success to replant in exactly the same holes, rather choose midway between the positions of the old trees. For notes on planting and sorts to plant, I would refer readers to last month's journal.

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## NOTES ON VEGETABLE-GROWING FOR JUNE.

BY GEORGE QUINN.

The weather during the past month has been favorable to the healthy growth of most vegetable crops, and good results are showing from past operations in most gardens.

The sowing and transplanting of cabbage, cauliflower, Brussels sprouts, kohlrabi, leek, onion, and lettuce should be continued during this month.

Bulbs of garlic and shallots should still be put in.

Sowings in drills of carrot, parsnip, onion, Swede turnip, ordinary turnip, red and silver beet, and broad beans should be made. In sowing these it is a good plan to drop the seeds thickly in the drills, when the first planting is made from a new or untried packet of seeds; if they germinate freely the later sowings should be made much thinner, as a high percentage may be confidently expected during the same season from the remainder. This observation, if put into practice, will save seeds and time in thinning out. Onions, silver and red beets may be sown in this manner, and the plants afterwards thinned out to about 6in. apart in the rows. Those removed in thinning can be replanted.

Before sowing peas or beans it is a good plan to pour hot water over the seeds to soften the hard coverings and thus hasten germination. This practice also helps to detect the "floaters" or useless seeds, so that they may be discarded, and thus avoid blank spaces in the rows. Small plots of cress, radish, and parsley should be sown. The two former vegetables should be kept in constant readiness by fortnightly sowings.

Sowings of peas may be made, but in most places the soil is now so wet and cold that those sown in July will overtake any sown now. The sugar or edible podded kinds are worth growing. They are a winter substitute for the French beans, and must be gathered when the pods snap as do the beans when in good condition for using.

Celery plants require to be carefully banked up from time to time so that the stems may be properly blanched. Liquid manure is a good help to celery just now. Sea kale should be sown in drills 1ft. apart, and when the plants are well up thinned out to 8in. in the rows.

Prickly spinach may be sown yet with hopes of success before the hot weather arrives. These seeds should be sown in drills and thinned out to 9in. apart. The leaves should be plucked first when about the size of a large spoon, and from thence onward a few plants will yield occasional pickings throughout the winter and spring.

The preparation and the planting of asparagus beds should be undertaken now. Instead of being a costly vegetable, only found on the tables of the rich, it should be grown by every cottager who has a small vegetable garden.

The ground must be trenched about 2ft. in depth, and about 3in. or 4in. of fine, rich, old, well-decomposed stable or cow manure worked into the bottom. The beds should not be trodden upon unnecessarily, and therefore about 5ft. is a sufficient width to make them. In this two rows should be planted in such a manner that they are 30in. apart, and equal distances from the sides of the bed. The plants should be one-year old seedlings of thrifty habit. They are planted 18in. apart in the rows, the crowns being placed 3in. or 4in. below the surface. The surface of the ground should then be top dressed with a mixture of well-rotted manure, to which a few pounds of salt have been added. *No stems should be cut away the first year.* Old asparagus beds should be cleared of the old yellow stems and receive a dressing of manure and salt, as described above, using about  $\frac{1}{2}$ lb. of salt to the square yard, which is about double the quantity recommended for young plantations.

The soil for rhubarb beds may be prepared as suggested for asparagus, omitting the salt dressings. The plants should have a space of about 2ft. 6in. every way to grow in.

In sowing most seeds a light dressing of a quickly dissolving manure, such as superphosphate—particularly for the turnips—sown with the seeds gives the young plants a wonderfully strong start. The use of manures of this class cannot be valued too highly for top-dressing vegetable crops when in active growth. This fact is largely appreciated by many of our most successful vegetable growers in this colony who have recognised the saving in labor and time as compared with dressings of barnyard or liquid manures.

## THE VINEYARD.

### NOTES AND HINTS FOR JUNE.

*Written for the "Journal of Agriculture and Industry."*

By ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

June should be a busy month in the vineyard. Pruning should be pushed forward as rapidly as possible, in order to make way for the ploughs. The first winter ploughing of a vineyard should take place in June. It should be given on a good deep furrow 6in. to 8in., heaping up the soil in the middle of the rows, and leaving the furrows alongside the vines. The soil should not be harrowed down or scarified, but left in rough condition until the following spring, when it will crumble down of itself at the second ploughing.



Those who have rooted vines to plant should start the work in June, unless the soil and district be too wet and cold. Early planting is generally to be recommended for dry countries.

I am of opinion that manures had better be spread during the course of June, and ploughed in with the first ploughing. If this is not found possible spread them on the rough soil, and harrow as early as possible.

## FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

May 31st, 1898.

The prospects of the season continue favorable, and although the rainfall during May was not so copious as that in April, we have still our two usually wettest months ahead, with the soil fairly moist in many districts. Unfortunately these remarks do not apply to our northern agricultural areas, where but little rain has fallen this year, and present conditions are causing farmers considerable anxiety. Beyond the areas referred to, in our far northern pastoral country, the season is exceptionally good, in fact one of the best they have had in some places since the country was taken up. If early rains had occurred throughout the agricultural portions, there would undoubtedly have been a considerable extension put under wheat cultivation, but the lateness of the season will in many parts prevent this. In the southern, central, lower and middle north districts feed has come on nicely, and is fairly abundant, so that stock show considerable improvement.

Dulness expresses the present condition of business throughout the colony, country trade being from hand to mouth.

The excitement in the grain market of the northern hemisphere, sending the price of wheat up as high as 53s. per quarter for European shipments had the effect of firmly establishing the previous nominal quotation of 5s. per bushel here, several good-sized parcels changing hands amongst dealers at that price. The reaction in London, however, down to 43s. 6d., with the difficulties at present being experienced in obtaining reasonable freights from the colonies has again caused values to ease 2d. to 3d. per bushel in the Adelaide market, and even present quotations could not be realized by exportation to Europe. Our small exportable surplus, however, will find outlet in some direction or other before next harvest, and values, unless a collapse occurs outside, are not likely to be much affected for the next few months. Flour, in sympathy with advance in wheat also improved. Business in forage lines is dull; bran has fallen away about 1d., pollard, however, continuing scarce at previous rates; chaff quiet; oats and barley having but little interchange. The comparatively small stock of potatoes held for time of year is evidently under better control; after falling away about 30s. per ton the price has again advanced, partly, no doubt under the influence of firming intercolonial rates. The bulk of supplies in this line also will have to be imported until our new crop comes in. A steady, if slight, improvement in value has marked the month's business in onions.

The setting in of colder weather is doubtless partly responsible for the check in increase of the supplies of butter, but we fear that the most important factor is only now beginning to be felt (namely, the very heavy losses amongst dairy herds during the past two and a half years' drought), and it will probably take a year or two to restore the colony's dairy interest to the position it had attained in 1895. A considerable though decreasing portion of the requirements of the colony is still being imported, but only from hand to mouth, as buyers fear a sudden increase in quantities from the country, of which, from foregoing remarks, our readers will learn we have very grave doubts. The price here has been somewhat erratic, at times falling below equivalent importing values, and at odd sales in scarce markets exceeding such limits. At the moment the market is high, but receding. The demand for eggs has been considerably heavier than supplies, although prices have not attained the extreme figures ruling at this time last year, no doubt on account of Melbourne and Sydney sending increased quantities to West Australia; a further advance, however, seems now imminent. Honey is again experiencing improved trade without any quotable alteration in value, beeswax finding ready sale; almonds brisk. Stocks of cheese are very much attenuated, and imported, in small quantities, is finding sale on this market; but consumption as usual during the winter time shows a considerable decrease. Bacon further eased during the month; with the raw material, however, very scarce—the necessity having arisen for importations of pigs—this line has a firming tendency at the moment.

In poultry a good month's business has been put through for all suitable table sorts, small and thin birds only being neglected. With the setting in of winter conditions, carcass meat, especially pork, is coming forward in increasing quantities, and realising prices very satisfactory to consignors.

## MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, 4s. 8d. to 4s. 10d. per bushel 60lbs.  
 Flour.—£12 per ton 2,000lbs.  
 Bran.—11d. to 1½d.; pollard, 1s. 2d. per bushel of 20lbs.  
 Oats.—Local Algerian and dun, 2s. 3d. to 2s. 6d.; stout white feed, 3s. to 3s. 6d.: New Zealand (nominal), 3s. 9d. per bushel of 40lbs.  
 Barley.—Malting, 4s. to 5s.; feeding sorts, 3s. 2d. to 3s. 6d. per bushel of 50lbs.  
 Malt.—Local, 8s. 6d. to 9s. 6d. per bushel of 40lbs.  
 Chaff.—£3 10s. to £3 17s. 6d. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.  
 Potatoes.—Mount Gambiers, £7 15s. to £8; Tasmanians, £8 to £8 5s. per 2,240lbs.  
 Onions.—£7 10s. to £7 15s. per 2,240lbs.  
 Butter.—Creamery and factory prints, 1s. 8d. to 1s. 9½d.; dairy and collectors' lines, 1s. 2d. to 1s. 5d.  
 Cheese.—S.A. Factory, large to loaf, 8d. to 9d. per lb.  
 Bacon.—Factory cured sides, 8½d. to 8¾d.; farm lots, 7d. to 8d. per lb.  
 Hams.—S.A. Factory, 8d. to 9½d. per lb.  
 Eggs.—Loose, 1s. 6½d.; in casks, f.o.b., 1s. 8d. per doz.  
 Lard.—In bladders, 7d.; tins, 6d. per lb.  
 Honey.—3½d. for best extracted, in 60-lb. tins; beeswax, 1s. 2d. per lb.  
 Almonds.—Soft shell, 3½d.; kernels, 8d. per lb.  
 Gum.—Best clear wattle, 2d. per lb.  
 Poultry.—Good table roosters, 1s. 6d. to 1s. 11d.; plump hens, 1s. 2d. to 1s. 5d.; poor birds, 10d. to 1s.; ducks, in prime condition, 2s. 6d. to 2s. 9d.; geese, 3s. 6d.; pigeons, 5d. to 6d.; turkeys, 5d. to 6½d. per lb., live weight.

## WEATHER AND CROP REPORTS.

AMYTON.—We have had a good deal of boisterous weather lately, but very little rain. Some wheat, grass, and herbage have germinated, but unless more rain falls soon the light falls we have had will have a disastrous effect on the prospects of the coming crop and pasture. Rainfall for May to 23rd, 0·470in.

ARTHURTON.—After a week of very cold weather we had a splendid fall of rain, registering over 4in. Seeding is being pushed on with all speed, farmers putting in as much as possible in anticipation of a good season.

ASHBOURNE.—The season has been very bad till lately, but splendid rains of late and genial weather have improved matters. Stock are improving, and the supply of milk is steadily increasing. Seeding is being pushed on, the land being in good order.

BALAKLAVA.—Dry cold weather put a check on vegetation early in the month, the grass beginning to turn yellow and seeding being almost at a standstill. A splendid fall of rain, over 2in., on the 16th and 17th, completely altered affairs, and seeding is being pushed on. The grass has improved, and early wheat is showing nice green. Manured crops are coming on splendidly. The lambing should be good. The outlook for the season is favorable.

BOWHILL.—The last month has been most favorable for seeding operations. Early frosts have checked the growth of the wheat and grass; until warm weather sets in it will not make much headway. Hay is getting scarce; at the end of ploughing there will be scarcely any left in the district.

CARRINGTON.—Rain is very badly needed, and farmers are getting anxious. It is almost too late to expect any green feed until spring. Seeding is finished, except in a few instances. Feed is very scarce, and farmers are removing their stock.

ELBOW HILL (Franklin Harbor).—The weather has been very seasonable for seeding operations, showers and sunshine alternating. All early sown wheat is well above ground, but owing to partial character of the rain, at Cleve, about twelve miles distant, it is very dry. Feed is scarce, and a good general fall of rain is now needed.

GAWLER RIVER.—The dry weather early in the month somewhat hindered seeding, but splendid rains have since fallen, and farmers are hastening to finish seeding. Drilling and manuring are becoming general. Feed has made a fresh start, and the cows are yielding more milk. Cattle and sheep are doing well, and will soon be in good condition again.

GUMERACHA.—The sowing of wheat and oats is nearly finished. The season has been exceedingly favorable, and the land in first-class order. About 75 per cent. of the seed has been drilled in with various manures. A large area is usually sown with peas during this and two following months; the drill and suitable manures will be used extensively; grass is plentiful, the season being most favorable to its growth. Stock are in good condition compared to last year. The milk supply has not decreased to same extent as in two preceding years. Heavy rain caused some damage to cultivated land. About 6in. for month to 17th.

**INKERMAN.**—The weather during May has been most seasonable for this district. As near as I can tell by reports, we have had a little over 2in. of rain, which, with the April rains, has made everything look very green. All the wheat sown early in month is looking well, and farmers generally are in good heart and pushing on the seeding with all possible speed. The area sown will probably be large.

**KAPUNDA.**—Feed for stock is not as plentiful now as it was three weeks ago; the weather during that time has been too frosty and cold, but we have since had good rains, and grass has made another start to grow. Rainfall for April was 3·410in. The greater portion of the seeding is over, and seed-drills are coming more into use. I do not remember ever having better weather for putting in the crops.

**LYNDON.**—Splendid rain again this month, over 2in.; will put the farmers in good heart. The advantages of the seed-drill are becoming recognised in this district, several farmers having invested in them. Seeding is well forward.

**MAITLAND.**—Again a splendid rain, about 3in., in Maitland and Kilkerran, making about 6in. in the last six weeks. The land has got a good soaking, and the feed, which has been rather backward owing to the frosty nights, is now growing fast. The wheat now up is looking well, and all farmers are busy finishing off tilling operations.

**MILLICENT.**—Farmers are all busy ploughing and sowing; large area being put in with drill and fertilisers. The weather, with the exception of two or three light frosts, has been all that could be desired. Feed is growing nicely. Rain for April, 2·910in.; for May up to date, 1·490in.

**MINLATON.**—The prospects are very promising, the April rains being about the best recorded for nearly eight years. Farmers appear to have learned some lessons, one being not to be in too much of a hurry to put their seed in before the land is in proper condition. Sowing is being pushed on, some of the crops being up and looking well. Horses in good condition. Feed on stubble land manured with phosphates last year is growing very fast. Sheep are scarce. Very few farmers but have drilled in their seed.

**MOUNT COMPASS.**—Good rains again, but several sharp frosts early in the month did some damage. Rainfall for April, 4·345in., and over 2in. since. Ploughing is general. Stock are falling off in condition.

**MOUNT GAMBIER.**—Light rains only experienced during month. Grass somewhat checked by frost, but making good headway. In this respect the season is all that could be desired. Lambing favorable so far, and promises of a good sheep season. Impaction still prevalent in some herds of cattle, owing to too dry feeding. Lice in sheep again showing.

**MOUNT REMARKABLE.**—Absence of rain and occurrence of frost caused the herbage to turn quite yellow. On the 14th steady rain set in, about 0·750in. being recorded. Wheat crops are backward.

**MURRAY BRIDGE.**—We have again been favored with fine rain, making the land most favorable for ploughing. There is every promise of good early feed, a good picking on stubble land, especially where fertilisers were applied last season. Stock in good demand, sheep especially being scarce and dear.

**MYLOR.**—About 3in. of rain recorded since previous report, but frost in early part of month cut many crops of potatoes. Green feed looking well.

**PETERSBURG.**—The outlook is far from encouraging. About ½in. of rain early last month brought up some of the early crops and started the grass in favored localities, but the dry weather and cold winds have nullified any good done; the green tinge has almost gone from the wheatfields. Only a ½in. fell on the 14th and 15th May, reviving vegetation somewhat, but a thorough soaking is anxiously looked for. Seeding is finished; feed and water scarce.

**PORT ELLIOT.**—We have had very favorable weather since the season changed on April 2nd, but farmers find the ground too hard to plough properly. During April 2·950in. of rain fell, being more than for the preceding six months. For this month to date 2·145in. have fallen, and as there has been an absence of frost so far, feed has had a good start.

**QUORN.**—Prospects are anything but encouraging, the total rainfall for four months being only 1·500in. There is no chance of getting rid of the weeds, and if there should be any crop it will be dirty. Seeding operations are nearly finished. Feed is very scarce. Rainfall for May, 0·760in. will improve things a little, but a good soaking is urgently needed.

**RIVERTON.**—A large area has been put under crop, most of it being drilled in with fertilisers. A steady soaking rain of over 4in. has fallen, giving the subsoil a good soaking. A large area of land has been fallowed for next season's crop.

**SADDLEWORTH.**—After ten days of drying east winds—very favorable for killing the young growth in the fallows and for drilling in seed—we have had magnificent rains, nearly 4in. being recorded during the week. Seeding was not finished, and will now be delayed. Stock are in fair condition. With the young feed coming on, and the ewes in good order, the lambing promises well. Rainfall for April, 2·400in.; May, 3·900in. to 21st.

**STOCKPORT.**—Seeding operations are drawing to a close. The weather up till the last week was all that could be desired for killing the weeds. The rainfall for the last week amounted to about 2in., which will give the feed and wheat a good start. A considerable area has been drilled.

**WOODSIDE.**—Since last report we have been favored with splendid rains and fine growing weather. With the exception of a few frosts, the season has been all that could be desired, and seeding operations are going on splendidly.

## FIELD TRIAL SOCIETY.

On April 6 the North-Western Amalgamated Bureau Field Trial Society held a field trial of implements at Crystal Brook. About 150 farmers attended, and took great interest in the work of the different implements.

In the seed and fertiliser drill trials there were six entries—two Superior drills entered by Messrs. Norman & Co., two Massey-Harris drills by Messrs. Clutterbuck Brothers, and two Farmers' Favorite drills shown by the Australasian Implement Co. The drills were put to the most complete and exhaustive trials, the final award being postponed until the crop was up to judge better the evenness of sowing. On April 30 the plots were inspected and the awards made as follows:—First, Superior, 42½ points; second, Massey-Harris, 39½; third, Farmers' Favorite, 36½—the maximum being 60.

In ploughs Messrs. Clutterbuck Bros. showed four-furrow, three-furrow, and two-furrow American ploughs, and were awarded first order of merit. They also won similar awards for cultivator and device for lifting ploughs or scarifiers. Messrs. Martin & Co., of Gawler, took first prize for steel plough and scarifier shares; Messrs. J. & R. Forgon for malleable and cast shares; Martin & Co. for plough or scarifier wheels and axles.

**RABBIT POISON.**—In a jug containing half a pint of water put 1½ sticks of phosphorus and a tablespoonful of bisulphide of carbon. This soon dissolves. In a bucket containing 3½ pints of water dissolve 3lbs. sugar. Put 10lbs. pollard in a large iron pot. When the phosphorus is thoroughly dissolved, pour it into the bucket containing the sugar, stirring well. Then pour the contents of the bucket into the pollard. Stir and knead the pollard with a spade until it forms a thick dough; then lift it out of the pot and lay it on a sheet of plain iron. Roll it out into a long, thin cake, ¼in. thick, then cut into little pieces and leave to dry over night. Next morning it will be ready for use. In cutting and rolling out it is best to shake a little dry pollard over the dough to keep it from sticking. Two or three batches of 10lbs. each is enough to make in a day. It does not hurt the hands when handling. The poison should be put out in a furrow.

**LOCUST DESTRUCTION BY FUNGUS.**—In Cape Colony a good deal of success in locust destruction was achieved at first by the use of "cultivations" of Dr. Edington's toxine fungus, and the Kaffirs travelled long distances to procure the "cultures" from the depôts. But later trials were not so effective, and inquiries are being made as to the reason why. This, most probably, will be found to be due to the later season of its use, and perhaps the greater age and maturity of the insects. In American States the chinch bug has been successfully dealt with in some seasons by scattering the dead insects on affected fields. These insects had been inoculated with a fungus which killed them, and the spores remain dormant in their bodies for years, until thrown upon the fields, when they become actively virulent, and infest all the chinch bugs that may come near enough to contract the disease.

**CENTRAL AGRICULTURAL BUREAU.**

MONDAY, MAY 16.

**PRESENT**—Messrs. F. E. H. W. Krichauff (Chairman), Samuel Good, W. C. Grashy, M. Holtze, H. Kelly, T. Price, C. J. Valentine, and A. Molineux (Secretary).

**Tree-planting.**

The **CHAIRMAN** said it often occurred that settlers obtaining forest and other trees from a distance found the bark more or less shrivelled. When this was the case the trees should be placed in a trench, covered over completely with pulverised earth, and then well watered. In a few days the bark will have freshened up again, having absorbed moisture from the damp soil. Exposure of the roots is always injurious, and where trees are to be out of the ground for several days the roots should be puddled in thin mud, and dusted with dry soil to exclude the air as much as possible.

**Gypsum.**

Mr. J. MILLER, M.P., forwarded communication urging the necessity for a careful search for gypsum and other fertilisers underlying and adjoining the salt lagoons throughout the colony.

The **SECRETARY** said the writer was under a misapprehension as to gypsum being a fertiliser. It only had chemical action on plant food already in the soil, and also in preventing the loss of ammonia from farmyard dung. The matter of searching for potassic and phosphatic deposits had already been brought under the notice of the Government.

**Insectivorous Birds.**

Mr. GRASBY tabled list of fifty-one birds of South Australia which could be regarded as amongst the most beneficial of our insectivorous birds. The list had been prepared by Messrs. Edwin Ashby and J. W. Mellor, after very careful consideration: birds that, while being insectivorous, were also injurious had been excluded as far as possible.

Considerable discussion ensued on the names of the birds, and the beneficial work of the crow and other so-called injurious birds. Members were of opinion that they could not be expected to express an opinion on the list submitted, as very many of the names were unknown to them.

A hearty vote of thanks was accorded to the compilers of the list, and it was decided to forward it to the Minister of Agriculture for consideration in connection with the proposed Bill for the protection of birds.

**Professor Lowrie.**

The **CHAIRMAN** called attention to the disparaging remarks passed by the members of the Victorian Council of Agriculture on the abilities of Professor Lowrie as a practical and scientific agriculturist. Although it was quite unnecessary to defend Professor Lowrie, as far as the farmers of this colony were concerned, he thought the Bureau, as representing the agriculturists of the colony, should place on record their opinion of his exalted ability.

Members were unanimously of opinion that Professor Lowrie had proved by his work at the college and his lectures and advice that he was possessed of the highest practical and scientific ability, and that his work had been of unmeasurable value to the colony, and was in itself the most complete answer possible to the disparaging remarks referred to.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers :—

211. *The Influence of Sunlight on Plants.*—In "Natural Science" it is stated that Mr. John Clayton selected twelve plants of beans of equal size, and while planting them near each other, six received the light of the sun and the other six only daylight. In October he collected the beans, and found that the weight of those from plants which had no sunlight against those from the others was as 29 to 99, and after being dried, as 1 to 3. Next year all the beans were sown and received the full sunlight; but the plants raised from the beans which had no sunlight bore only half a crop, and these beans being planted again and again, they produced in the fourth year only blossoms but no pods. The withholding of the sunlight during the one summer weakened the beans so much that their progeny died out altogether in the fourth year.

212. *Export of Eggs.*—Large quantities of eggs are exported from Hamburg to England through the firm "Pfeifer," which pays £2,500 rent for cooling rooms at the Hamburg slaughter-houses. They keep them there from May to the end of November, at a temperature of 38° F. Denmark, however, tries hard to beat all other importers by means of quantities and quality. The Danish Egg Export Company forwarded in 1896 eggs of the value of £84,000, which were carefully examined by a light in a dark room as to soundness, and divided into five sizes, of which only the first four are exported. One hundred and twenty of them weigh respectively 18lbs., 17lbs., 16lbs., 15lbs., and 13lbs. The boxes used contain 1,400 eggs packed in wood wool. It is expected that in 1898 twice as many eggs will be exported, as the Danish eggs are much inquired for. In the first eight months of 1897 England imported eggs to the value of £2,745,582.

213. *Nitrate of Soda with Farmyard Dung.*—Mr. Kofahl, of Zernikow, calls the attention of farmers to the fact that the use of the above manures at the same time gives frequently no favorable result. He is of opinion that the farmyard dung contains the bacteria which live upon saltpetre almost invariably in large numbers, and these prevent the plants from using the nitrogen sufficiently quick. The frequently observed result, that a single application of much nitrate of soda is not at all equal to that of the same quantity thereof if applied in two or three doses, seems certainly confirmatory of Mr. Kofahl's observation.

214. "*Nitrugin*" is a cultivation of the bacteria which either form or take possession of the nodules or excrescences found upon the roots of clovers and other leguminous plants, and which are supposed to vary in each species of these pea-flowering plants, although no difference has yet been detected under the microscope. These bacteria are very abundant in rich soils; but in poor land they may be deficient, and the leguminous plants cannot obtain a sufficiency of nitrogen in consequence, and therefore they cannot thrive. The late Professor Hellriegel found that plants without these excrescences would die as soon as the nitrogen contained in the seeds was exhausted if sown in sterilised quartz sand; but if soil in which leguminous plants had thriven were added to the quartz sand, then the nodules were soon formed, and the plants became luxuriant. These bacteria have been named *Bacillus radicola*. It has been found that bacteria from peas are less efficacious on vetches, and not at all on clover, serradilla, and robinia, whilst bacteria from these last three plants had no beneficial effect upon peas. It has not yet been ascertained how the nitrogen is obtained from the air; but neither the green plant alone nor the bacteria alone can assimilate it. The bacteria are changed by degrees to peculiar organisations called bacteroids, and these (by the comparatively large surface exposed to the air through their netted grouping in the cells of the excrescences) may probably absorb the free nitrogen in the rays of the cells, and assimilate it for the plant. If the particular bacteria affecting the crop to be grown are not present, the nodules may still be formed on the roots, but nitrogen may not be collected. When the proper bacteria have once been introduced, they will be found for several years if the appropriate legume is cultivated. Instead of carting soil from fertile fields where legumes have thriven on to fields deficient in the beneficent bacteria, it has been the practice lately to cultivate the various kinds of bacteria in suitable liquids, and to apply these cultures in a diluted form directly on to the fields, or to the seeds about to be sown. Very many experiments in this direction have been conducted by numerous scientific persons, with apparently a good amount of success in several cases, but in other instances with little or no visible improvement. The latest reports upon this subject are published in the *Central-Blatt für Kunstdünger Industrie* (artificial manure industry), of March 21, 1898, containing an article on "*Nitrugin* and *Alinit*," by Professor Wagner, in which he states that the results, so far, lead him to conclude that he cannot recommend to farmers the general use of nitrugin for the cultivation of leguminosæ, except where the soil, even with the best care and manuring, has failed to yield crops. His experiments with alinit were even more unsatisfactory, so far as conducted.

### New Members.

The following gentlemen were approved as members of the undermentioned Branches :—Red Hill, Mr. R. T. Nicholls ; Gawler River, Messrs. D. Humphrie and H. Roberts ; Swan Reach, Mr. G. Grieger ; Clarendon, Messrs. R. Hilton and S. Bottrill ; Dawson, Mr. C. C. Kyd ; Tanunda, Mr. G. W. Thomas ; Kadina, Mr. J. W. Taylor ; Brinkworth, Messrs. A. L. McEwin, H. Cornish, and G. Freebairn ; Willunga, Messrs. J. Hockney, T. Pengilly, and R. Russell ; Woodside, Messrs. F. D. A. Heidrich, N. Schroeder ; Golden Grove, Messrs. D. Smith and R. Coleman ; Port Germein, Mr. A. H. Thomas ; Albert, Messrs. A. P. Johnson and W. Napper ; Lyndoch, Mr. R. Loveridge ; Tatiara, Mr. C. H. W. Wiese ; Boothby, Messrs. H. G. Evans and J. K. Way.

### Reports by Branches.

The SECRETARY reported receipt since previous meeting of sixty reports of Branch meetings.

## REPORTS BY BRANCHES.

### Onetree Hill, April 1.

Present—Messrs. J. Bowman (Chairman), G. Bowman, J. Flower, J. Harvey, J. Hogarth, F. L. Ifould, A. Thomas, E. A. Kelly, W. Kelly, and J. Clucas (Hon. Sec.).

**AMBER CANE.**—The Chairman tabled a splendid sample of Amber cane, over 7ft. high, grown on newly broken-up, dry sandy soil, without any irrigation.

**CHEESE-MAKING.**—Mr. F. L. Ifould read a paper on this subject, of which the following is the substance :—

The butter fats vary very materially in different breeds and under different local conditions, but may be set down at from 3 per cent. to 5 per cent. A milk containing an average of these quantities is quite rich enough, as far as butter fats are concerned, to make a good cheese. Cows whose milk contains the largest proportion of butter fats (namely, Alderneys) are not so profitable to the cheesemaker as to the butter-maker. At the same time it must not be inferred that butter fats are absolutely dispensable in the manufacture of good cheese, as undoubtedly the more butter fat the better the cheese ; but I am speaking of a good ordinary marketable cheese.

While touching on this matter I may point out the greatest difficulty the honest cheesemaker has to contend with, that is, cheese placed on the market from which more or less butter fats have been previously extracted. I regret to say a great deal of this cheese is to be found in the markets of this colony. Anyone having a knowledge of cheese can easily detect it ; and I say it is utterly impossible to make butter and good cheese from the same milk. Should, however, a milk contain an abnormally high percentage of butter fats, then perhaps a little cream can be taken, and still leave sufficient to produce a good sound nutritious cheese. But the practice largely in vogue of running together a cream separator and cheese-making plant certainly deteriorates the quality of the cheese.

Milk is always undergoing a change, from the time it is taken from the cow until it is consumed in the shape of butter or cheese ; therefore it is of the utmost importance to those who manipulate it that the greatest care should be exercised in the handling, so that no undue influence be brought to bear to hasten its maturity and ultimate decomposition. Providing it is obtained from healthy cows (which have not too recently calved), and the local surroundings are clean and wholesome, it is easy with a little care and practice for anyone to make at least a palatable cheese, in the manufacture of which the three most important natural agencies are heat, rennet, and salt. Therefore, let us take any given quantity of milk and add the necessary rennet and coloring, for cheese made from uncolored milk is absolutely white. It should coagulate in about thirty minutes. Directly the rennet produces the necessary solidity in the milk it begins its work of decomposition, and from this point the greatest care must be exercised, together with the aid of the other prime factors, heat and salt, so that the influence of one counteracts the influence of the other in a sufficient degree to convert the milk into an article of food.

The coagulated block of milk is now cut into small squares with knives made for the purpose, and heated to 98° to 100°, which increased heat helps the rennet to perform its work; in an hour or two the curd standing at this high temperature is sufficiently matured for the time, and the bulk of the water or whey expelled, leaving only the milk solids and milk sugar, which has already been partly converted into lactic acid. To prevent the rennet, which has hitherto unceasingly been performing its work of disintegration, from going too far salt is applied. While speaking of salt I may mention, as my candid opinion, that there is no salt manufactured in the colony fit for use in any dairy, whether for butter or cheese, and I am confident that many a pound of these products is absolutely ruined by the use of our colonial salt. After the salt is thoroughly incorporated with the curd, it can be removed in hoops to the press, and in about twenty minutes taken out, bandaged, and returned to the press; very gentle pressure being used at first and gradually increased, when in about twenty-four hours the cheese can be removed to the curing room, the temperature of which should not fall below 60°, nor rise above 70°. After the lapse of about three months (during which time it has been turned daily), the cheese should be sufficiently matured. Many makers make a great mistake in pressing cheese too long and too severely, under the impression that it is necessary to expel the moisture and make the cheese solid, but instead they expel the most delicate ingredient, namely, the butter fat, and render it hard and dry. Providing the cheese be properly made twenty-four hours' pressure is ample. At the end of the time, should a certain amount of moisture still remain in the cheese, no amount of reasonable pressure will remove it, but in the course of time the cheese will absorb that moisture, causing early maturity and rendering the cheese unsolid and holey, and possibly strong in flavor. The whey which comes from a well-made cheese should never approach the appearance of milk during any part of the operation, but should always maintain almost a colorless hue with a light yellowish-green tinge.

As regards the relative profit of cheese and butter making, it depends entirely on the market prices, but for the sake of comparison I may mention that 1 gall. of milk weighing 10½ lbs. makes 1 lb. of cheese. To make a corresponding weight of butter it requires 3 galls. of milk (probably more in extreme hot weather) under the pan-setting system, whereas with the aid of the cream separator 2½ galls. will produce 1 lb. Now, taking butter at 1s. a pound and cheese at 6d., the balance is in favor of the latter, which, by the way, is somewhat reduced by the value (to the credit of butter) of the skim milk, as against the small value of whey. Then, again, supposing the farmer who has the necessary appliances for making both finds in the flush of the season, when his milk supply is largest, butter bringing only 6d. a pound, as it often does, then, I maintain, cheese-making is far and away the more profitable, and he can usually find a market for any quantity over and above his own requirements to at least place this credit balance on a better footing than if he had been making butter alone at the ruinous prices usually prevailing for that product in the glut of the season. However, I have no doubt that most of you would be pleased to see a cheese and butter factory established in this district, where all the work could be carried on under one roof, and instead of one farmer having all the trouble and necessary expenses of making his own butter and cheese, co-operation in this, as in other districts not so favorably situated, would bring about the desired end; and I am confident that it would prove a source of profit to the supplying shareholders and a blessing to their wives and families.

### Hahndorf, April 30.

Present—Messrs. F. H. Sonnemann (Chairman), C. Jaensch, H. Spoehr, C. Bom, A. L. Paech, J. C. Rundle, and D. J. Byard (Hon. Sec.).

**MANURING.**—Considerable discussion took place on the use of commercial manures and the seed drill. Doubt was expressed as to the success of the drill in sticky soil in wet seasons.

**PROTECTING SEED WHEAT FROM BIRDS.**—Mr. Jaensch said he had for many years succeeded in preventing the birds from taking the seed when sown broadcast by simply steeping the seed before sowing in tar-water.

**FRUIT-GROWING.**—Several members stated that their apples were covered with something like a rust, which causes decay. It was also stated that apples and potatoes, which could usually be stored for a long period, were already decaying. Members attributed this to the severe drought. The Chairman said the yield of grapes in this district was the best for many years, and was due to the unusual heat of the past summer and the absence of spring frosts.



### Gawler River, May 2.

Present—Messrs. A. M. Dawkins (Chairman), J. Hillier, G. Johnston, A. Hatcher, R. Badcock, T. P. Parker, F. Roediger, and H. Roediger (Hon. Sec.).

CONGRESS.—The Chairman suggested that a good subject for discussion at the Tenth Annual Congress of the Bureau, to be held in September, would be "The Protection and Uses of our Native Birds."

FODDER PLANT.—Mr. Parker read a clipping from the weekly *Chronicle*, dealing with the Florida Velvet bean, which was, according to the description of the writer, the most wonderful culinary, fodder, mulch, and soil-renovating plant ever grown. It was decided to ask the General Secretary if he knew of this plant, and whether it could be recommended for cultivation in this colony. [I have never before heard of this most wonderful plant, nor can I hear of any one else who has. From the statements made as to its wonderful growth, the plant must either be of a distinctly tropical nature or the writer of the descriptive notes must have an "axe to grind." In all probability it is an old friend—or enemy—disguised under a new name in order to defraud the hard-working cultivators of the soil.—GEN. SEC.]

PICKLING WHEAT.—Considerable discussion took place on this subject. It was generally considered that when the seed is pickled on the floor 1 lb. of bluestone dissolved in 2 galls. of water is sufficient for a bag of seed, while if the seed is immersed in the pickle 1 lb. per bag is necessary.

IMPROVEMENT OF SEED.—The advisableness of improving our seed wheat was discussed at length. Some members favored improvement by selection, and were doing this, having selected some of the best heads from last year's crops, saved the grain, and sowed it separately for seed purposes next season. Judicious change of seed was also favored.

### Gumeracha, May 2.

Present—Messrs. W. Cornish (Chairman), W. Jamieson, G. F. Nepean-Smith, D. Hanna, R. P. Scott, W. A. Lee, and Dr. G. Nicholls (Hon. Sec.).

EXHIBIT.—Mr. Jamieson tabled sample of Italian marrow, weighing nearly 40 lbs., grown from Bureau seed.

OFFICERS AND MEMBERSHIP.—Messrs. W. A. Lee, D. Hanna, and Dr. Nicholls, were elected Chairman, Vice-chairman, and Hon. Sec. respectively for ensuing year. A vote of thanks was accorded to Mr. Cornish for his services during the past three years. Feeling reference was made to the loss sustained in the death of Mr. Ridler, an old and well-esteemed member of the Branch.

SCIENCE CLASSES.—A sub-committee was appointed to prepare a scheme for the initiation of evening classes in connection with the Branch

### Forster, May 2.

Present—Messrs. A. Johns (Chairman), J. Retallack, F. Towill, H. Fidge, J. Sears, J. R. Bolt, W. H. Bennett (Hon. Sec.), and four visitors.

PICKLING WHEAT.—Mr. Sears considered pickling in a cask, with block overhead to lift the bags, the best way of pickling to prevent bunt. Dissolve the bluestone by suspending it in a piece of branbag in water; place about one-third of a bag of seed in a branbag and dip it in the pickle. About 8 ozs. of bluestone is sufficient for one bag of seed. Mr. Fidge said it was necessary to move the bag about when dipping, so as to ensure that all the seed is thoroughly pickled.

**SEEDING.**—Mr. Retallack favored sowing the seed on the surface and ploughing it in to about 4 in., as in dry seasons much better results are obtained from this method than from sowing after ploughing. The best way to sow was from the dray with a lad to drive. Mr. J. Sears said for a small area hand-sowing was perhaps best, but when there was a lot to be done the machine must be used. The Chairman considered ploughing under conducive to "black rust"; machine sowing was better than hand. Mr. F. Towill considered ploughing-in of the seed better than sowing after ploughing only on good, clean land, not on grass land. Mr. Fidge said he could sow better from horse-back than from the dray.

**CATTLE COMPLAINT.**—Mr. Fidge reported that one of his cows, though in good condition, has since calving given only about a cupful of milk at each milking. This was her fourth calf, and previously she had always milked well. As she had not been affected by any complaint, he could not understand what was the matter with her. [Butcher!—GEN. SEC.]

### Koolunga, April 7.

Present—Messrs. T. B. Butcher (Chairman), R. H. Buchanan, J. Sandow, R. Palmer, J. Butterfield, A. Craig, R. Jackson, J. Button, J. Freeman, W. Ballinger, E. J. Shipway, W. T. Cooper, W. J. Jose, and G. Pennyfield (Hon. Sec.).

**PAPER**—Mr. Sandow read a short paper on "The Work of the Agricultural Bureau." It was decided to invite Professor Lowrie to give an address at an early date at Koolunga. Other business of local interest was transacted.

### Clare, April 15.

Present—Messrs. J. Christison (Chairman), W. Birks, H. Carter, H. Miller, J. Treleaven, J. McCarthy, W. Kelly, and visitors.

**FRUITS.**—Mr. Treleaven tabled a collection of apples and pears of good quality. Members were unable to determine the names of some varieties.

**BINDING AND HEADING WHEAT.**—Mr. G. Phillis, of Snowtown, introduced a discussion on this subject. He stated he stacked his sheaves and (as required) chaffed them, winnowed the chaff, and saved the grain. He considered that a fair saving in labor and machinery was caused by this plan. The Chairman favored this method on a small scale and where a quantity of stock is kept, but only small quantities of grain could be got ready at one time for market unless a very large amount of space was provided for storage of the chaff. Mr. Carter thought the grain was not so well colored when cut in the sheaves, but other members said it was both better colored and heavier. Generally members favored sheaving and heading the crop where practicable.

### Nantawarra, May 2.

Present—Messrs. S. Sleep (Chairman), A. F. Herbert, J. Nicholls, E. J. Herbert, R. Uppill, and T. Dixon (Hon. Sec.).

**CROWS AND WHEAT.**—In reply to question, members were agreed that crows eat the wheat, and instances were given of the birds picking holes in bags of oats to get at the grain, and pulling up the wheat plants for the grain attached.

**MANURING.**—Professor Lowrie's notes in the April *Journal of Agriculture and Industry* were read and well discussed.

### **Inkerman, May 3.**

Present—Messrs. S. Diprose (Chairman), E. M. Hewett, D. Fraser, W. Fraser, and W. A. Hewett (Hon. Sec.).

**KAFFIR CORN.**—Mr. D. Fraser tabled plants of Red Kaffir corn of fair growth. Members thought the plants had done very well considering the severity of the season.

**FALLOWING.**—Mr. W. Fraser strongly advocated early fallowing in preference to late. The ground worked much better, and the benefit was greater. He thought our machinists had devoted all their attention to the improvement of the stump-jump implements, and neglected plain-land ploughs, which were not up to present requirements.

**OFFICERS.**—Messrs. S. Diprose and W. A. Hewett were re-elected Chairman and Hon. Sec. respectively for ensuing year.

**COPRA CAKE FOR COWS.**—The Chairman said he had been using copra cake with feed for his cows with most satisfactory results.

### **Auburn, May 5.**

Present—Messrs. E. M. Dudley (Chairman), Klau, G. R. Lambert, Ford, W. F. Keyner, and Dr. J. W. Yeatman (Hon. Sec.).

**SEEDING.**—Considerable discussion took place on the question of early seeding or waiting for winter rains if delayed. Members agreed that, having had nearly 2in. of rain in April, seeding should be commenced not later than the first week in May. Mr. Ford said that in the absence of good rains it was safer to wait until the end of May. Last season, near Auburn, half of a paddock was sown dry, just before rain came, and turned out almost a failure, while the other half, which was sown in June after rain had fallen, but otherwise under exactly similar condition, returned a fair crop. A considerable area in this district is being sown by means of seed and fertiliser drills.

### **Millicent, May 5.**

Present—Messrs. R. Campbell (Chairman), H. F. Holzgrefe, H. Oberlander, H. A. Stewart, W. R. Foster, G. Tantram, and E. J. Harris (Hon. Sec.).

**WHEAT EXPERIMENTS.**—Mr. Holzgrefe said he had experimented with twenty-two varieties of wheat, and found nothing equal to Red Tuscan, with White Tuscan, however, close up. Mr. Tantram had had splendid returns from Dart's Imperial wheat.

**SEASON.**—Rainfall for April, 2·910in.; May to date, 0·320in. Early green feed coming on well, and promising abundant supply. Large quantities of commercial fertilisers were being used in the district.

**SPARROWS.**—Mr. Holzgrefe said now was the time to treat sparrows to phosphorised wheat on early sown crops. He had destroyed his contingent, and wished his neighbors would do likewise. He kept a supply of phosphorised wheat in a close barrel, and always had it ready. If well mixed it will keep almost any length of time.

**EXHIBITS.**—Mr. Foster tabled splendid collection of products grown by Mr. W. Foster, including quinces, gourds, orange, sunflower, teazel, tobacco, pearl millet, Kaffir corn, broom corn (9ft. high), saltbush, teosinte, &c. The plant of teosinte weighed 45lbs., and was good fattening for pigs. The saltbush was grown on poor light soil, and Mr. Foster was of opinion that it would do well on the grass lands. Members thought the saltbush well worth attention in this district, and accorded Mr. Foster a vote of thanks for his interesting exhibit. Mr. Stewart tabled fruits of egg-plant, and Mr. Oberlander plants of lettuces and leviathan mangold for distribution.

**Mount Remarkable, May 4.**

Present—Messrs. H. B. Ewens (Chairman), A. Mitchell, S. Challenger, A. Pope, G. Yates, T. P. Yates, and T. H. Casley (Hon. Sec.).

CONGRESS.—Considerable discussion took place on this subject, a suggestion of the Hon. Secretary's that this Branch write to the other Branches urging them to combine in requesting the Government to grant free railway passes to two delegates from every Branch, coming in for considerable attention, but no decision was arrived at. The Hon. Secretary said the producers in this colony were treated worse than in any other colony in this matter.

**Port Elliot, April 30.**

Present—Messrs. C. H. Hussey (Chairman), P. O. Hutchinson, H. Green, J. Brown, O. J. Whitmore, H. Pannell, and E. Hill (Hon. Sec.).

CONGRESS.—It was suggested that at the forthcoming congress the matter of dealing with pests should occupy a prominent place, and that the desirability of the Government bearing portion of the cost of quarantining imported stock should also be considered.

APPLES.—Mr. Hutchinson tabled very fine specimens of London Pippin and Scarlet Nonpareil apples. Mr. Whitmore showed apples affected with disease commonly known as "Bitter pit," the surface being more or less covered with rounded depressions, connected beneath the skin with brown spots having a bitter taste. [The only treatment for this is to boil or burn all infected fruit, and spray the trees before the buds burst in spring, and again after the fruit is formed, using Bordeaux mixture for the first application and the same or the ammoniacal copper carbonate solution for the later spraying.—GEN. SEC.]

**Dowlingville, May 6.**

Present—Messrs. R. A. Montgomery (Chairman), T. Illman, G. Mason, H. Crowell, R. Foggo, J. Burkin, and J. L. Broadbent (Hon. Sec.).

MANURING.—An interesting discussion took place on manuring and the use of the drill. Dissatisfaction was expressed at the fact that the Fertilisers Act simply compelled sellers of fertilisers to give guaranteed analysis, instead of fixing a limit as to quality. Some members have had very satisfactory results from these fertilisers applied to vegetables. Sulphate of ammonia as a liquid manure, and superphosphate being strongly recommended. The Chairman said he tried sulphate of ammonia with potatoes, but although there was a noticeable benefit, the absence of rain prevented any fair test as to whether it would pay to use it. Mr. Foggo stated he was using a good deal of wood ashes, put on with the seed drill. Mention was made of the loss of fertilising contents through the mixing of certain manures.

**Brinkworth, May 5.****INAUGURAL MEETING.**

Present—Messrs. J. Graham (in chair), W. H. Pearce, W. Wundke, C. Ottens, H. Weckert, R. Cooper, A. L. McEwin, and J. Stott.

BUSINESS.—Messrs. R. Cooper, J. P., and J. Stott were elected Chairman and Hon. Sec. for ensuing year. It was decided to meet on the first Thursday in each month for the present. Other routine business was transacted.

**Quorn, May 5.**

Present—Messrs. J. B. Rowe (Chairman), F. Herde, Jas. Cook, C. Patten, and A. F. Noll (Hon. Sec.).

**VALUE OF SMALL GARDENS.**—Mr. Cook read a short paper on this subject, of which the following is the substance :—

My object in writing this paper is to encourage others similarly situated to do as I have done, and grow some fruit and vegetables for home use. I find it as easy and as cheap to grow these things as to find the money to buy them from others, and besides everyone will admit that freshly gathered fruit and vegetables are far more appetising and beneficial than those picked and hawked for several days. In ordinary seasons the rainfall is sufficient for from four to six months growing of vegetables, and when we get summer rains, as in years 1891 to 1894, grapes and other fruits will mature without any irrigation. Generally, however, irrigation must be resorted to in the summer months in this district, and where water can be obtained at a reasonable depth the expense will be amply repaid. In many places in the township permission can be obtained to run the water off the streets on to the land, and good gardens can be maintained in this way. A thorough good soaking of the soil and sub-soil will carry plants through a long spell of dry weather. Even a patch about two rods square will, if well looked after, produce a surprising quantity of vegetables. Even where no water is obtainable, one or two vines planted on the east or west side of the house or sheds, and trained up to the roof, especially on a slope without any guttering, will produce a large quantity of fruit. A very old vine at Hampton Court, in England, is reputed to bear over 2,000 bunches annually, and, having seen the vine, I believe this quite within the mark. Surely with care and a good climate we could get 130 bunches from an old established and well-trained vine. Do not attempt too much at first. A single vine or fruit-tree well attended to will pay better than a dozen neglected. In 1894 my garden only covered an area of 2½ chains, yet the produce, besides a good supply of vegetables, was 20cwt grapes, 11cwt. tomatoes, and over 600 cucumbers. There were three plums, two quinces, four peaches, two nectarines, two lemons, and one orange in profitable bearing, the lemons being of very high quality, and took first prize wherever shown. Besides the cost of the trees and vines, which is very small, I spent £15 in sinking a well, erecting tanks, windmill, &c. There was also the cost of erecting high wire netting round the garden, fixing alarm bells and other appliances to prevent the fruit from being stolen. This has been the greatest discouragement to me, and the thieving of fruit should be put down by means of heavy fines or imprisonment, as it is a serious evil.

A good discussion followed, the members being of opinion that, if water were plentiful and the position good, a windmill was the best for raising water. Mr. Herde said he had one vine trained on his verandah which last year set 150 bunches, but owing to the severity of the season they did not all mature.

**Arden Vale, May 2.**

Present—Messrs. A. Hannemann (Chairman), M. Eckert, M. Searle, F. Schutloffel, A. W. Fricker, L. Warren, P. Starr, D. Liebich, E. H. Warren (Hon. Sec.), and several visitors.

**SHEEP.**—Mr. B. J. Stocks, of Willochra, contributed the following paper on “Notes on Sheep-farming on a Small Scale” :—

When starting, secure 100 or more good, strong-woolled ewes, 5 to 6 years old, say in October or November. At this time the sheep would fetch 3s. to 5s. per head. At 5 or 6 years, if with good, sound mouth, they are most suitable for farmers to breed from. Put the rams with the flock in January, about one to every fifty ewes, and you should get a 90 per cent. lambing in June if the rams are in good condition. June will generally be best month here for lambing, though if you have good feed and water April would pay well, as the lambs would come in earlier. June lambs in an ordinary season, with good dry grass or stubble, will keep fat and in good condition up to February and March, when they fetch best prices in Adelaide. They should weigh about 30lbs., and fetch 6s. to 7s. net, if prime. A 3 to 5 year old ram is most suitable for flock purposes, and should be separated from the ewes quite a month before lambing. A 5 to 6 year old ewe should cut 7lbs. of clean wool if on good feed. The grower can rely on 5d. to 5½d. per lb., or 8s. per sheep, and very often more. The most suitable time to shear is about September or October, before the grass seeds, burs, &c., ripen. Any dry or defective ewes should be culled and specially marked at shearing time, and used for ration purposes. Lambs should be weaned at four months, or earlier if green feed is available. Tail them at one month, leaving two joints; put a mixture of Stockholm tar and turps on the cut;

never use kerosine. In cutting ram lambs, slit the purse instead of cutting it off. To keep up the number and improve the quality of the flock, get an experienced man to select the best of the young ewes each year for breeding purposes. Where dogs are plentiful yarding is necessary, but the sheep should be let out before sunrise, and yarded at night. A good brush roomy yard on a slope or rise, with a good netting fence around will protect from cold winds and dogs. If possible have small paddocks, and make them sheep-proof.

**VEGETABLE-GROWING.**—Mr. P. Starr read a short paper on this subject. He advocated early varieties. Cabbage, cauliflower, and onion seed should be sown in nursery beds about the middle of March, so as to have plants ready for planting out at first rains. A thin coat of old manure over the seed is beneficial. Early York cabbage and Early London cauliflower were about the best. If water is to be had, plenty of decayed manure should be put in the cabbage beds. Before transplanting, saturate the nursery bed so as to cause the earth to stick to the roots. In planting, trim the roots and tops of onions. If water is handy an early bed of turnips will be found useful; the tops will be ready within the month. When the rain does come, peas, carrots, turnips, &c., should be planted by every farmer. A good discussion followed. Mr. E. Venning recommended a little clay being mixed in the nursery bed, as the soil will then adhere better to the roots when transplanting. Members said they found tomatoes were not a great success if hard water is used.

**EXCHANGE OF SEEDS.**—Mr. Fricker suggested an exchange of flower seeds between the members of the Bureau, the Central Bureau acting as the medium of exchange. [This would entail a lot of expense and work for very little result. Good reliable flower seeds are very cheap, and by several neighbors combining to purchase a small lot the individual expense would cost little more than the expenses of carrying out an exchange between different members, besides which many of the best kinds of flowering plants require a lot of attention to keep up the standard, which can only be given by a professional or an experienced amateur.—GEN. SEC.]

### Woodside, April 23.

Present—Messrs. C. W. Fowler (in chair), J. C. Pfeiffer, E. Esau, J. Caldwell, jun., A. S. Hughes, and G. F. Lauterbach (Hon. Sec.).

**SEED WHEAT.**—Mr. Jno. Hutchens sent the following paper on "Seed Wheat":—

Seed wheat should be properly cleaned before sowing. It is far better to give the broken grains, drake, oats, &c., to the fowls or pigs than to sow them, as there is always enough rubbish in the land without sowing more. When procuring seed it is very necessary to know that it does not come from too dry a climate. Seed grown on a dry sandy soil, and in a dry climate, has such thin bran that when sown in a wet climate, and in wet soil, the bran is very likely to burst before the grain has time to germ, and the result is a failure. I have known many failures on this account; but, on the other hand, with seed taken from a wet climate to a drier one no danger will occur. A change of seed is often recommended, but my experience is that seed, especially wheat, is all the better to be acclimatised. I have sown the same seed on the same land for many years, and with good results; and I would recommend every farmer to grow his own seed as much as possible.

The seed must be properly pickled before sowing, to prevent smut. It is far better to grow a head of wheat than to grow a head of smut, even for hay. Some people say that they have tried pickling, and they had as much smut as if they did not pickle; but I am sure this is due to carelessness in pickling. There is an objection to pickling on account of the trouble and time. It takes very little time and trouble to pickle a large quantity of wheat if done on the floor by putting a few bags down at a time, and sprinkling and stirring two or three times in order to get all the grains wet. Another way, and easier one, is to get a cask large enough to dip a bag, or half bag, at a time, and draw out by means of a lever. An easy way to prepare the pickle is to take the required quantity of water, say 2½ galls. to each bag of wheat to be pickled, put it in a cask, take about from ¼ lb. to ½ lb. of bluestone for each bag of wheat, put the bluestone in an old bran bag, and hang it in the water. In about two hours it will be all dissolved, thus doing away with boiling, pounding, or soaking, in hot water.

Considerable discussion followed, members generally agreeing with the opinions expressed in the paper.

**VISIT TO HOMESTEAD.**—This meeting was held at Mr. Hughes' farm, near Woodside, the members inspecting the homestead and surroundings. They were especially pleased with the buildings, there being a large galvanized iron shed to hold 100 tons of hay, and containing, besides a chaffcutter, the silo pit, wagons, and implements all being under the same roof. A very substantial cowshed, constructed of sawn redgum timber, with iron roof, has accommodation for twenty cows. Members generally considered the homestead one of most conveniently arranged, and the farm one of the best kept in the district. Mr. Hughes stated that although the first outlay on the buildings was heavy, the benefits derived from them amply repaid this expense in a very short time. The Government Jersey bull "The Baron," was much admired, members being of opinion that his presence would be of distinct advantage to the district. A seed-drill was at work drilling in wheat and sheep manure in a satisfactory manner. Mr. Hughes said the manure was gathered on his sheep run, and sifted by means of a sieve invented by himself before being put in the drill. He had 15 to 20 tons prepared in this way.

### Willunga, May 7.

Present—Messrs. T. Atkinson (Chairman), W. J. Binney, Dr. Counter, Jno. Binney, J. A. Jacobs, A. Slade, W. J. Blacker, M.P., Jno. Allen, and C. Bray (Hon. Sec.)

**CHAIRMAN.**—Mr. Atkinson tendered his resignation as Chairman on account of ill health. Members regretted the necessity for this action, and passed a vote of thanks to Mr. Atkinson for his services since the inception of the Branch. Mr. W. J. Blacker, M.P., was appointed chairman.

**SEED EXPERIMENTS.**—Mr. W. J. Binney reported on experiments with Bureau seeds, and tabled samples of Red and White Kaffir corn and Russian sunflower of very good growth. The Hon. Secretary reported that at the school plots Kaffir corn from South Australian seed grew 6in. taller than from imported seed, both being sown on the same day under exactly similar treatment.

**"SOUSOPS."**—Messrs. Binney reported that some years ago they treated patches of this weed (*Oxalis cernua*) with a thick dressing of salt, and since then had been able to grow nothing on the patches. They asked if anyone could advise how to bring back the land to fertility. Dr. Counter said a compound of arsenic was better than salt for destroying this weed, as it did not injure the soil. [Probably the most economical way of correcting the mistake would be to manure heavily with good rotted stable manure, and grow mangolds for two or three seasons. Mangolds remove a lot of salt from the soil. To destroy "soursops" the best way is to either keep the surface constantly stirred, or break it up and turn pigs on. The pigs are very fond of the bulbs, and will root out nearly all.—GEN. SEC.]

### Kanmantoo, May 6.

Present—Messrs. T. Hair (Chairman), J. Downing, J. Hair, J. Mullins, A. Hair, and W. G. Mills (Hon. Sec.).

**NEW APPLE PEST.**—Mr. Downing tabled specimens of a new weevil which was attacking his stored fresh apples. They eat a small hole in the fruit, and the apples went bad in a very short time. He had lost a lot of apples through their ravages. They were very like the wheat weevil in appearance, but much larger.

### Pyap, April 29.

Present—Messrs. B. T. H. Cox (in chair), T. Teale, W. Axon, K. F. Huselius, J. Holt, H. Mills, E. Robinson, C. Billett, F. Muirhead, A. J. Brocklehurst, W. C. Rodgers (Hon. Sec.), and one visitor.

**TREE LUCERNE.**—Mr. Brocklehurst reported that he had very strong plants of this fodder, 4ft. to 5ft. high, from seed sown about two years ago. Members stated that grass seeds planted last spring and left to nature had not yet germinated.

**SWEET POTATOES.**—Mr. Brocklehurst tabled sweet potatoes, about 3lbs. weight. From five plants he got 45lbs. of tubers. The plants were put in in August, about 4in. deep, in unmanured land. If properly manured they would yield very heavily here. If planted in August they require forcing, but in September the plants will grow without any artificial heat. Mr. Huselius said he had tried feeding sweet potato tops to his cow, with the result that the flow of milk had increased. She was nearly dry when he started the experiment, but at first milking gave an increase of half a pint, which was gradually increased. There was no taint perceptible in the milk. Mr. Teale considered the tubers profitable for pig-feeding. One member stated that he got 18½lbs. from one plant, and 17lbs. from another.

**PIG COMPLAINT.**—Mr. Huselius said some young pigs on the settlement showed large scabs on their bodies, and appeared generally out of health. They were turned out with others, suckled from another sow, and soon improved in condition, the scabs disappearing. Members appeared to be of opinion that in-breeding was the cause of the complaint.

### Robertstown, May 4.

Present—Messrs. N. Westphalen (Chairman), W. Mosey, sen., W. Armstrong, A. Day, A. Rhode, H. Rhode, A. Preusker, and S. Carter (Hon. Sec.).

**BUSINESS.**—Some discussion took place on the forthcoming Congress in Adelaide. Other business of local importance was transacted, and programme of future meetings arranged.

### Watervale, May 2.

Present—Messrs. C. A. Sobels (Chairman), J. Thomas, W. Leithbridge, S. Solly, W. Field, E. Treloar, H. Beck, and E. E. Sobels (Hon. Sec.).

**SOWING WHEAT.**—Considerable discussion took place on the relative merits and demerits of the seed-drill and seed-sower. No decision was arrived at; but members suggested that the matter might be discussed at the forthcoming Congress in September.

**CODLIN MOTH.**—The outbreak of codlin moth at Clare came in for consideration. Members were greatly disappointed that the pest had by some means been introduced into a clean district, and thought it would discourage growers from extending their gardens. The Watervale district is, as far as known, quite free from the pest, and members hope that full precautions will be taken to prevent the further spread of the pest.



**Petersburg, May 7.**

**Present**—Messrs. W. Miller (Chairman), W. Heithersay, H. Earle, and J. Wilson (Hon. Sec.).

**CONGRESS.**—The Chairman suggested that the Congress meetings should be held in the evenings, as delegates generally had a press of other work during the daytime.

**SUGARGUMS.**—The Hon. Secretary said that in the discussions at previous meeting on cultivation of sugargum, the question of topping had not been mentioned. He wished to know if it was advisable to top trees planted in the streets and other places where they are required for shelter and not for timber. Mr. Heithersay thought it advisable to top the trees when about 16ft. high; they should also be trimmed to keep them evenly balanced. Mr. Earle agreed, but the Chairman doubted whether it would have much effect as far as shade was concerned, as the trees naturally have but few leaves in proportion to their size.

**CATTLE COMPLAINTS.**—The Hon. Secretary reported that the Chief Inspector of Stock, with the General Secretary, had visited Mr. Cochrane's farm, and after a careful inspection could find no plants of a nature likely to have caused the death of so many cattle. Mr. Valentine attributed the deaths to complaints of the digestive organs caused by innutritious feed, and regretted the local inspector had not had an opportunity of making a *post-mortem* examination of any of the cows. If more cattle were put on the land and were taken ill, he would have the matter thoroughly investigated. As preventive treatment he would recommend that any cattle brought on to the farm should be given a tonic. Mix dry 1lb. sulphate of iron, 2lbs. sulphur, 20lbs salt, and 40lbs. bone meal. Give each animal half a pannicanful of this in the feed two or three times a week at first, increasing the quantity by degrees to a full pannican.

**POISON PLANT.**—Mr. Parkinson, of Paratoo, forwarded specimens of supposed poison plant. To be forwarded to Central Bureau. [This is a dwarf form of *Euphorbia cremophila*, reputed to be poisonous to stock, but is rarely eaten by them.—GEN. SEC.]

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**Golden Grove, May 5.**

**Present**—Messrs. T. G. McPharlin (Chairman), S. A. Milne, J. R. Smart, F. Buder, J. McEwin, W. J. Rhen, A. Roberts, H. P. Day, Jno. Ross, and Alexander Harper (Hon. Sec.)

**DEEP CULTIVATION.**—The Hon. Secretary initiated a discussion on the effect deep cultivation of the hill slopes would have in regard to the washing away of the soil, which is a very serious matter in this neighborhood, not only in the loss of soil, but through breakages of machinery at harvest time. He contended that by breaking up the soil and allowing the water readier access to the subsoil there would be much less of this washing away of the land during prolonged and heavy rain. Generally most of their wheatfields are represented by a few inches of cultivated soil overlying a hard, smooth, and often inclined plane, or hard pan, which is almost a complete bar to the downward course of moisture during an emergency; consequently the surface soil soon reaches the point of saturation and washes away. An animated discussion, embracing the whole principle of deeper cultivation, ensued, members being fairly divided in their opinions. Those against the practice were not opposed to it as a rational procedure so much as because they were of opinion that any advantages gained would be outweighed by the increased cost of cultivation.

### Meadows, May 3.

Present—Messrs. J. Catt (Chairman), W. Pearson, W. J. Stone, T. B. Brooks, H. V. Wade, W. Collins, G. F. Grigg, W. Nicolle, D. Tester, and W. A. Sunman (Hon. Sec.).

CONGRESS.—The following matters were suggested for discussion at Congress: The necessity for effective means being taken to prevent the sale of adulterated fertilisers, and the necessity for destruction of mongrel bulls allowed to wander at large.

GRAFTING AND BUDDING.—Mr. Grigg tabled very fine sample of Rome Beauty apple, grown on graft put in last year on a small limb off an old tree. He said that this was preferable to grafting direct on the large limbs of an old tree. There were thirty-four fair-sized apples on the one stem this season. He found the newer wood healed over better than the old. With buds he follows the same principle; after putting the bud in new wood, cut off the top to force growth. This, of course, only referred to old trees to be grafted or budded.

MANURES.—Considerable discussion on chemical manures took place, the members being of opinion that in this district superphosphate and bonedust gave best results. Mr. Pearson said he had purchased a seed-drill, and offered to allow members the use of it at a nominal charge.

### Port Pirie, May 3.

Present—Messrs. E. J. Hector (Chairman), H. B. Welch, W. Smith, P. J. Spain, T. Gambrell, G. M. Wright, F. R. Humpries, W. Mallyon, and R. J. Ferry (Hon. Sec.).

THIN SOWING.—Mr. E. J. Hector read the following paper on this subject:—

Nature is always prolific in seeds, and provides for their dispersion by aid of the winds, or they are carried away by numerous insects, birds, and animals, and washed to great distances by the streams which spread over the plains. Without these aids to dispersion, plants would all germinate close to the parent stem, crowd and choke one another, exhaust the nutriment of the spot, and dwindle away, becoming each year more and more diminutive, until they would become too weak to produce seed, and finally decay and be lost for ever. As it is a good reason matures myriads of seeds, the major portion of which are consumed by animals, birds, and insects, yet a sufficient supply always remains on the soil to replenish it with such a thick herbage that most of the plants are choked out of existence to make room for the more robust. Our northern country is sometimes visited by copious summer rains which cause premature germination of seeds, producing plants only to be burnt up by the hot sun; and one would have thought that this unseasonable germination of grasses and herbage would have left no seed to renew our winter pastures. Droughts have occurred in the Far North for three years, the earth has been swept clean and bare of all the vestiges of seed, and it seemed as if the country would always remain a desert. Not so, no sooner has a good rain come in either of these instances than the ants and other insects could be seen busily carrying out their seeds from their underground stores and distributing them over the surface, which soon became covered with verdure. The cultivator of the soil can distribute his seed in a far more regular manner than Nature, and can adjust the quantity exactly to the fertility and condition of the soil. If he puts on too little seed, he cannot expect a full crop; if, on the contrary, an excess of seed is sown, overcrowding of the plants causes them to choke and rob each other of the necessary moisture and nutriment, and to produce smaller and less valuable seeds. It is most important to sow the proper amount of seed, which is between these two extremes. This must have been wellknown to the ancients, for we read of Isaac sowing and reaping a hundredfold. St. Mark says—"Good seed sown in good ground is said to produce in some places thirtyfold, forty, fifty, and even a hundredfold." Another says a hundredfold was saped in Garada in Syria, and in Byzantium in Africa. Pliny, the great Roman authority, says 400 stalks of wheat from one grain were sent to the Emperor Augustus, and that he has seen the soil of this field which, when dry, the stoutest oxen could not plough, but after rain it was opened by a share drawn by a wretched ass on one side and an old woman on the other. If we look at what Nature is doing, we invariably find that the best and strongest plants

producing the most and finest seed of every species are isolated, have plenty of space for their development, and that wherever plants grow thickly together the seed is less prolific and more diminutive. These considerations should incline us in cultivation to err rather on the side of thin sowing.

Taking the wheat plant for example in England, "Louden" recommends upon well-prepared land 2 bush., or about 120 lbs., which he calls a thin sowing. In France, the compiler of "La Maison Rustique" advocates 80 lbs. per acre sown broadcast, or one-third of this when drilled or dibbled 6 in. to 9 in. apart. In South Australia the quantity sown per acre varies from 60 lbs. to 30 lbs. per acre, the average being about 45 lbs. Let us see how thick this will sow an acre broadcast if it is evenly distributed as it should be. An acre of land contains 43,560 sq. ft. I have carefully weighed and counted the grains contained in 1 lb. of Medea wheat, a large-grained wheat harvested in 1897, and counted 5,250 grains, which multiplied by 45 lbs. gives 236,250 grains, and divided by the square feet in an acre shows five grains and a fraction per square foot, which is more than double as thick as it ought to be if every seed germinated. If we are to believe the most successful authorities who adopt the mode of dibbling or of drilling, the best results without subsequent cultivation are obtained by putting in the grains at least 6 in. apart. In Belgium and in England the heaviest crops of the finest and largest grain have been produced by dibbling. Hallett's famous Pedigree wheat, which surpassed every other wheat in England twenty or thirty years ago, was grown by dibbling quarter of a bushel or 15 lbs. of seed per acre, and by selection of the finest ears 80 bush. being no uncommon yield, which, by the way, beats the ancients' hundredfold, as it is 320 fold. Other considerations determine the amount to be sown, such as the fertility of the soil, its state of cultivation, the exact period of sowing, whether early or late, the number of robbers in the shape of ants, mice, grain-eating birds, &c., the quality of the seed, and the percentage destroyed by pickling. Broadcast sowing, however well done, cannot give the same results as dibbling or drilling, even with the best cultivation, for, in addition to the losses by faulty grains from the stripper, there will be very considerable losses by too deep burying or not covering it at all, and depredations by insects, birds, and mice. But I will assume that the average loss does not exceed 50 per cent. from all these causes, that is to say, one-half the seed is lost and one-half the seed will grow. Now I have shown by all the best authorities in dibbling and drilling that wheat planted 6 in. apart has been the most prolific, and, allowing this space, it will only take 33½ lbs. or, say, 34 lbs. of wheat sown carefully broadcast per acre to give the best results, assuming that 50 per cent. of it grows and reaches maturity. The reason why wheat sown thinly gives a better return is that each plant has more soil to sustain it with moisture and soluble nutriment; there is no choking of one plant by another, and less struggle for existence, for it is well known that there is no weed so great an enemy to any plant as another of the same species crowded against it. And the scanty rainfall of our northern areas emphasises this argument, for the thicker the crop the sooner does it exhaust the moisture and prematurely ripen its seed, or, worse still, blight or die. I purpose on a future occasion to pursue this subject, and to give results of some experiments in other cereals and lucern sowing, which I have made in the Pirie district.

Mr. Welsh was rather averse to thin sowing of wheat in this district owing to the severe winds which prevail at harvest time and the patchy, unequal nature of the soil. Mr. Wright also opposed thin sowing, owing to the scanty rainfall. He thought ¾ bush. per acre about the best quantity to sow. Mr. Spain agreed, and strongly recommended the use of the seed-drill. Mr. Mallion supported Mr. Hector's statement, while Mr. Smith said he sowed 30 lbs. of Carmichael's Eclipse wheat per acre last season, and reaped 8 bush. per acre. Mr. Humphris said throughout his experience he had got best results from thin sowing. On sandy soil 20 lbs. per acre was enough. He had seen in thin-sown patches, in the early days, single plants bearing as many as 160 heads of wheat. A great deal, however, depended on the soil, as on certain soils much better results were obtained from moderately thick sowing. The general opinion of members was in favor of thin sowing in preference to thick.

### Finniss, May 2.

Present—Messrs. T. Collett (Chairman), W. W. Heath, A. Willcock, H. Langrehr, and S. Collett (Hon. Sec.).

CONCERNS.—Mr. Heath suggested that at the forthcoming Congress the subject of manures and their action on different crops might be discussed.

### Lyndoch, May 13.

Present—Messrs. H. Kennedy (Chairman), W. J. Springbett, A. Springbett, M. Burge, and J. Mitchell (Hon. Sec.).

**ORANGE TREES.**—Mr. W. J. Springbett said that last year his orange trees looked so bad that he thought of grubbing them out, but he cut some of them back to the forks in September, with the result that they have produced new branches about 6ft. long, and are now looking quite vigorous, although they have had no irrigation during summer. The others that were not cut back are looking very sickly, and he proposes to cut them back also about September next.

### Forest Range, May 5.

Present—Messrs. J. Vickers (Chairman), A. Green, J. G. Rogers, H. Caldicott, R. E. Townsend, J. Cherryman, G. Monks, J. Green, J. Sharpe, J. Caldwell, S. A. Collins, and R. M. Hackett (Hon. Sec.).

**FRUIT FLY.**—It was carried unanimously that this Branch is pleased to notice the prompt action taken by the Central Bureau [and the Department of Agriculture—GEN. SEC.] to prevent the introduction of the fruit fly in bananas, &c.

**POTATO CULTIVATION.**—Mr. J. Green read the following paper:—

Good, rich, dark, loamy soils are best for potatoes, and if new all the better; but if new soil is not available it may be necessary to use plenty of manure. The light-colored soils sometimes become dusty, and then light crops result. Stable manure is best, but bonedust is good. Not more than two crops of potatoes should be grown successively upon the same ground. They do well after a crop of cabbage. Where it can be done, the best way is to plough and plant the setts in every third furrow, 8in. to 9in. wide and 4in. to 5in. deep, about 1ft. apart in the furrow. Cut setts are best where the ground is not too wet; cut to one or two eyes. When planted, at once scarify the land with Planet Junior horse hoe, and harrow about a fortnight later. If this is done there will be very little hoeing required when the plants are 6in. to 9in. high. Earthing up is needed, because the potatoes grow on the stalk above the set, and they are liable to get sun-burned. Every hoeing tends to keep the moisture in the ground. The Planet Junior horse hoe is the best implement for earthing up; put the two mouldboards on the outside, but let the three times remain. The two in front break the soil, and the one behind leaves it in a loose condition, doing better and quicker work than can be done with the hand hoe. The best time to plant in this locality on land that cannot be irrigated is from the middle of September till the end of October. Probably the White Elephant is the best variety to plant; they are splendid eating where the land is not too wet. Seed should be changed every year, from the plains, if possible, for October planting, and from our own locality if put in earlier.

Mr. S. A. Collins thought White Elephant the best all-round sort for the district, but would plough and plant setts a little deeper. Potatoes for seed kept better when green, and second crop come up more quickly. One year he planted shoots of Circular Heads with eye attached, and got a good crop. Where watered this year potatoes gave good crops. Mr. J. Vickers used kainit for one crop, and got good results. Twenty inches between the rows was better than 27in., as the tops shaded the soil better. When he put setts deeper he found potatoes no deeper, and considered 2in. deep enough, then harrow and leave for a week before harrowing again. He used 4cwt. kainit with 1cwt. superphosphate; super. by itself goes down too quickly. Brown's River did no good with him. Had planted setts of other variety when apparently shrivelled, and in moist soil had done well. When keeping seed in shed move them once a week to check growth. Small seed gives large potatoes and less weight of crop. Mr. J. Sharpe some years ago planted a bag of potatoes about the size of a pigeon's egg and got a crop. If the land is in good heart, and there is enough moisture, there will be a good return. Regent was inferior to Magnum Bonum as a second crop. Seed should be kept in a well-ventilated loft. Mr. R. E. Townsend said last year he planted one bag and got a return of

fifteen, but this season he put in fourteen bags and got eleven back; seasons had the most to do with returns. He ploughed out his crop with a potato plough, which was as clean as digging. Mr. G. Monks found 27in. between rows and 15in. between setts gave best results—24in. did not give sufficient for earthing up. From  $\frac{1}{2}$ cwt. Beauty of Hebron seed he got 15cwt. good potatoes, about 5lbs. to each plant. He advocated use of large setts with only one eye; if several eyes are left they will produce a lot of spindly stems. Brown's River seed gave him no good results. Mr. J. Cherryman gets better crops from small seed than from either large or cut seed. If the ground is in order, one or two eyes get the start and the rest die away. Directly roots are formed they draw nourishment from the ground. Dig only along the rows, not between the setts. White Elephant rots very badly in wet ground. Mr. J. Green, in reply, did not think that size of seed was of any account if the ground is favorable.

### Bowhill, April 26.

Present—Messrs. W. G. F. Plummer (Chairman), J. G. Whitfield, W. Towill, A. Dohnt, E. Weyland, J. Waters, J. Gregory, and H. H. Plummer (Hon. Sec.).

**SAND IN HORSES.**—Mr. Whitfield said he thought some of his horses had been as badly sanded as they possibly could be without dying. He treated them with veterinary homœopathy, using aconite and nux vomica, and this removed the sand, since which the animals have gone to work, have improved in appearance, and have sleek coats. Mr. W. Towill read the following recommendations from a leaflet on veterinary homœopathic treatment of horses:—*Flatulent colic*: There is a drum-like distention of the stomach. Use nux vomica or ammonium causticum, ten drops every fifteen minutes. *Spasmodic colic*: Severe pains, with intervals of ease. Use aconite and nux vomica alternately, ten drops every quarter-hour. *Costiveness or confined bowels*: Use nux vomica and sulphur alternately, twelve drops every three hours. *Tympanitis*: Horses suffering from effects of wheat, give two buckets of water, then ride them till they sweat freely, but be sure not to let them get chilled. Then administer ten drops of aconite four times at intervals of fifteen minutes; then give some every hour until pain ceases.

**COMBINED RIVER BRANCHES SHOW.**—It was resolved to co-operate with other river Branches in holding a show of products.

### Port Germein, April 30.

Present—Messrs. G. Stone (Chairman), J. K. Deer, J. Bews, A. Thomson, H. H. Glasson, W. Broadbear, D. Thomson, W. Crettenden, W. Head, and H. J. Gluyas (Hon. Sec.).

**CHAFF TRADE.**—Considerable discussion took place on the present unsatisfactory method of selling chaff, and the bag difficulty. Members thought some standard should be fixed as the weight for a bag of chaff, and that the bags should in all cases be sold with the chaff, as such a small percentage are returned to the sellers under present arrangements. Members were of opinion that united action should be taken by those in the trade to bring about a more desirable system than that now in vogue.

**ONIONS.**—Mr. Glasson read a paper on "Onion Growing," which was well discussed. Members were of opinion that owing to deficient rainfall this district was not suited to the extensive cultivation of onions.

**Port Broughton, May 2.**

Present—Messrs. R. W. Bawden (Chairman), J. Harford, J. Barclay, B. Excell, E. Dennis, W. Tonkin, H. H. Whittle, W. R. Whittaker, and S. M. Bawden (Hon. Sec.).

**DAIRYING.**—It was decided to ask the Dairy Expert to visit the district and deliver a lecture on dairying.

**BINDER V. STRIPPER.**—Mr. Dennis said last season he cut half of a fifty-acre paddock of wheat with the binder, and threshed with Bagshaw header, while the other half was stripped. The first portion gave 4bush. of grain per acre, and the rest 8bush. He was convinced it would not pay to use the header, as so much of the grain was left in the short heads in the sheaves. There is not such a quick return from the binder, and there is more labor. Mr. Whittle said he had had a lot of experience with both binder and stripper, and was sure it would not pay to harvest more of the crop with the binder than sufficient to furnish seed and straw for own requirements. If you carry a stack of headed straw over for two or three seasons, it is probable you will find when you want to use it that the mice have destroyed it. In a district like this, where most of the land is mullenised, and the binder has to be set to cut high to escape the stumps, it will never pay to harvest less than a 12bush. crop with the binder. It was decided that the members consider it does not pay to use the binder and header in this district, the stripper being most profitable.

**Mundoora, May 5.**

Present—Messrs. J. Blake (Chairman), W. Atkinson, R. Harris, W. Aitchison, A. McDonald, G. Haines, T. Haines, J. J. Vanstone, W. J. Shearer, N. J. Francis, T. Watt, and A. E. Gardiner (Hon. Sec.).

**STOCK COMPLAINTS.**—Several cases of colic amongst horses were reported, Bickford's colic drench having generally been used with satisfactory results. Mr. Harris said a few weeks ago a number of his sheep were suffering from what he took to be acute indigestion. They got stiff in the fore legs, were unable to walk, laid down, and in a few days died. He took a few of the animals to the homestead, made a mixture of equal parts of cream of tartar, saltpetre, and carbonate of soda, giving each sheep a tablespoonful of the mixture in a pint of water two or three times a day. In very bad cases he gave one packet of Epsom salts in addition. He placed the sheep in slings made by fastening bagging across the top of a box, so that a little of their weight came on their legs. He then placed them on the lee side and close to the stack of hay, so that they could help themselves. This treatment was quite effective in curing the animals, and he had not lost a single one since. The treatment only lasted a few days, when the sheep were again able to join the flock.

**Albert, May 7.**

Present—Messrs. J. Wetherall (Chairman), J. Brewin, G. Haggard, G. Acres, H. Lane, T. Cooper, A. Struthers, H. Smith (Hon. Sec.), and five visitors.

**KAFFIR CORN.**—Mr. Lane reported that Kaffir Corn had done very well, and was a fairly heavy cropper. He thought it would be very suitable to plant as temporary breakwinds to prevent the sand being blown away during summer time.

**RAINFALL.**—Recorded for April, nil.

**Elbow Hill (Franklin Harbor), May 10.****INAUGURAL MEETING.**

**Present**—Messrs. E. Wake (in chair), C. G. Ward, sen., H. Dunn, J. Foulds, Jas. Spence, sen., W. Ward, H. T. Styles, J. Elleway, sen., T. Story, W. Spence, W. Beincke, G. Wheeler (Hon. Sec.), and seven visitors.

**OFFICERS AND RULES.**—Messrs. Edwin Wake, J. P., and G. Wheeler were elected Chairman and Hon Secretary respectively. The suggested rules for conduct of business, furnished by Central Bureau, were read, and, after some discussion, adopted in full.

**BUNT.**—Mr. Beincke said he was always particular to use only thoroughly ripe seed. He never pickled when sowing on dry soil, but always did after rain. He preferred to pickle on a good floor in preference to dipping. It was not advisable, even if pickled, to sow bunted wheat. Mr. Styles said the soft wheats seemed more liable to bunt than the harder kinds. He agreed as to danger of sowing unripe grain. Some land seemed more liable to smut than others. Mr. Foulds was convinced that they need not fear for the crop if they used clean seed and pickled with 8ozs. of bluestone to the bag. Other members agreed as to the necessity for pickling, 8ozs. bluestone in 4galls. water to the bag of wheat being favored, and that even "smutty" grain, if thoroughly pickled could be sown without danger. On a vote being taken as to the best mode of pickling, the majority favored using the pickle once only and on a good floor.

**OPHTHALMIA.**—Mr. Foulds reported his bullocks were suffering from some complaint causing a blue scum over the eye and frothing at the mouth. Mr. W. Spence said he had several cows and bullocks similarly attacked, and had tried several remedies, but found nothing so satisfactory as ordinary "eye-water." [Bathe the eyes three times a day with 1ozs. tincture of opium in a quart of water. If possible keep the animals in the shade. If opium is not readily obtainable, use sulphate of zinc lotion.—GEN. SEC.]

**WEED.**—Attention was directed to the fact that stinkwort had been introduced into the district and was beginning to spread. It was decided to consider the matter at next meeting.

**Cherry Gardens, May 10.**

**Present**—Messrs. E. Wright (Chairman), T. Jacobs, C. Lewis, J. Lewis, G. Hicks, W. Nicholls, J. Potter, S. Richards, J. Metcalf, R. Gibbins, G. Brumby, J. Choate, C. Ricks (Hon. Sec.), and four visitors.

**CONGRESS.**—Three members promised to attend forthcoming Congress, and Mr. Ricks said he would endeavor to prepare a paper on "Intense Culture as it affects the Farm and Dairy."

**"SOURSOPS."**—Mr. Gibbins asked how to destroy this weed (*Oxalis cernua*). Members were of opinion that the best way to get rid of them was to turn pigs on to the land. Mr. C. Lewis said fowls would also eat the bulbs, and even the despised sparrow would do the same.

**POTATOES.**—Mr. Gibbins advised planting potatoes in early spots free from frost. Early Rose, Beauty of Hebron, and White Elephant were the best sorts. As soon as the plants show through the ground, give a top-dressing of superphosphate, and then hoe it in.

**ALGERIAN OATS.**—Mr. Potter asked whether it was advisable to sow Algerian oats for hay. Mr. Gibbins said he had grown this oat, and cut it in different stages from green to ripe; but his cattle would not touch it unless almost starved. He advised members not to sow Algerian oats, but to put in Champion oats.

**SEPARATED MILK.**—In reply to question members stated that from 10galls. of milk put through the separator, 8galls. of skim milk should be obtained.

**BRANCH SHOW.**—It was decided to hold the Annual Branch Show on March 16, 1899. [Will other Branches please note this date, so as to avoid any clashing with similar engagements.—GEN. SEC.]

### **Boothby, May 10.**

**Present**—Messrs. J. T. Whyte (Chairman), E. Bradley, T. Robinson, H. S. Robinson, F. Mills, J. A. Foulds, M. Leonard, R. Chaplin, J. Bell, R. M. B. Whyte (Hon. Sec.), and two visitors.

**WHEAT EXPERIMENTS.**—Mr. W. T. Mortlock, M.P., forwarded samples of new wheat, imported by him from Europe, for trial. Each of the members undertook to give these wheats a trial, a vote of thanks being accorded to Mr. Mortlock for his gift. The Chairman distributed seed of a new variety of wheat called Pike's Excelsior.

**FIELD TRIAL.**—It was decided to endeavor to arrange for a field trial of the seed drills in the district.

**VERMIN-PROOF FENCING.**—A long discussion took place on the erection of the proposed new dog-proof fence around the district of Franklin Harbor, the members generally being in favor of the scheme.

### **Orroroo, May 7.**

**Present**—Messrs. S. Roberts (Chairman), J. Jamieson, M. Oppermann, G. Matthews, R. Coulter, E. D. Kirkland, and T. H. P. Tapscott (Hon. Sec.).

**CONFERENCE.**—Members agreed to support suggestion of Appila-Yarrowie Branch that the postponed Conference of Northern Branches should be held at Gladstone at an early date.

**PAPER.**—Considerable discussion took place on paper on "Should the State make Mechanics?" read at previous meeting by Mr. Matthews. Members generally agreed with the opinions expressed in the paper.

### **Onetree Hill, May 6.**

**Present**—Messrs. F. Barritt (Chairman), F. Bowman, J. S. Harvey, T. S. Harvey, J. Hogarth, J. Flower, F. L. Ifould, A. Thomas, A. Adams, and J. Lucas.

**ASPHODEL.**—The Chairman referred to the spread of this weed (*Asphodelus fistulosus*, or wild onion) in many parts. Members stated it had not yet appeared in this district, though a small patch was growing near Gawler.

**ARTESIAN WATERS.**—Mr. Hogarth read an interesting paper on artesian boring, describing his own experiences in search of artesian water, the different drills used, their methods of working, cost, &c. He believed his firm was the first in South Australia to obtain artesian water by boring, as over twenty years ago they obtained water at a depth of 140ft. The water from our South Australian bores was generally too brackish for irrigation purposes, but he believed better water would be obtained by deeper sinking, as in Queensland. Considerable discussion took place on cost of plant, accidents, working operations, &c.



### Lyrup, May 3.

Present—Messrs. A. Thornett (Chairman), D. Thayne, A. Pomeroy, D. J. Bennett, W. Healy, P. Brown, A. Weaver, E. Layton, F. E. Chick, T. Nolan, O. Klemm, W. H. Wilson (Hon. Sec.), and two visitors.

**EXPERIMENTS.**—Mr. H. Downer tabled samples of Beauty of Hebron and Flour Ball potatoes, grown on very heavy land, unmanured. The soil was simply broken up and exposed to the weather for a little time before planting. The tubers averaged 8 in. to 9 in. in circumference. Members were of opinion that the Flour Ball was the best for this district. Mr. Pomeroy tabled samples of apples, Japanese date plum, wheat, and grasses. The wheat was Dart's Imperial variety, being second crop 3 ft. high, sown in December and irrigated; a very fair sample. The grasses were from Bureau seed, and he reported as follows on the specimens tabled:—Mitchell grass (*Astrobla triticoides* and *A. pectinata*), 1 ft. 3 in. and 2 ft. high; the former a very good fodder and superior to the latter. Tall Gramma grass, Black Gramma, Red Gramma, all hardy perennials, about 3 ft. 6 in. high, free seeders. Blue Gramma, 4 ft. high, much finer than others. Switch grass, 3 ft. high; Bushy Blue Stem, 4 ft., both well flagged. Wild Rye (*Elymus virginicus*), 2 ft. high, sweet-smelling grass, very soft and dense. Wheat grass (*Agropyron acutum*), 2 ft. high, very dense. Two hardy perennial grasses, names unknown, 1 ft. 6 in. and 2 ft. 6 in. high, good fodders.

**FRUIT PESTS.**—Mr. Chick tabled plant of strawberry attacked by disease supposed to be strawberry-leaf blight. The description and remedies given in pamphlet issued by the New Zealand Department of Agriculture were read and discussed. Mr. Pomeroy said he had frequently seen the same disease in England and Australia, but it did not appear to affect the fruit. Mr. Thayne said one of his plum trees was being destroyed by white ants.

### Redhill, May 9.

Present—Messrs. F. Wheaton (Chairman), A. A. Robertson, H. Darwin, S. H. Treclour, D. Steele, R. H. Siviour, G. Wheaton, L. R. Wake, and T. McDonald (Hon. Sec.).

**SOWING MACHINES.**—The Hon. Secretary read a paper on "Broadcast Seed-sower v. Seed-drill," of which the following is the substance:—

In these days of keen competition, extensive cultivation, and low prices, it is highly necessary that we should cultivate our lands on the most improved principles, using such machinery as will best repay for their use. In farm machinery, as in most other things, there has been a gradual evolution during the last twenty or thirty years. If we go back thirty years, the unfortunate farmer had to carry the seed in a vessel of some description, distributing it with his hands as he tramped over the rough ground, this being both hard work and slow. Then carts were brought into requisition, from which the sower broadcasted the seed with his hands as before, which made the work much easier and somewhat faster. Later on, broadcast sowing-machines were invented, and although they may have been rather crude and imperfect at first, they have since been improved in various ways, so that now broadcast seed-sowers are capable of doing good work, both as to quantity and quality, and at a price within the reach of almost every farmer. It was some years before prejudice was sufficiently overcome to allow some farmers to use a machine for seed-sowing, in fact there are some now who consider that they can beat any machine by hand-casting. A considerable number of seed-drills are now used, and machines of various makers are in the market. As a machine for distributing manure on the land, there is no doubt that the drill stands alone, but as a seed-sowing machine the question is open to debate. In the first place the price, £40, is beyond what a great many farmers can afford. Four broadcast machines can be bought for that price. But, on the other hand, if by using a drill a bush of seed can be saved on every acre sown—and I believe such is the case—then the farmer who drills 250 acres saves in one season 62 bush., which,

at 3s. 6d. per bush, amounts to £10 17s. In three years the saving would more than cover the extra cost of the drill. Then in the matter of draught, two horses are required to work the broadcast machine, whereas the drill requires three. In the matter of dispatch, the broadcast would come off best, as I believe about twenty acres per day is the most that the drill can accomplish. Considerably more than this can be sown with the broadcast; but where fallow has been well prepared, and ready for the seed, the drill will then compare more favorably, because after you have gone over your land with the drill you have finished, but in the other case, after broadcasting, you have yet to go over the same ground with your harrows. Even on land where early rain had made the rubbish come up well previous to seeding, you must scarify before broadcasting and harrow afterwards, but in drilling, the drill acts as a scarifier; but if you harrow afterwards there would not be much difference in the two systems. Wear and tear is considerable in the broadcast machines, owing to the great speed required; the distributor in particular is very liable to wear, no matter of what metal it is made. I cannot claim to know much about the mechanism of the drill, but I don't think the wear and tear will be so great as in the broadcast machines. Some points of advantage in the drill are—(1) a saving in the quantity of seed; (2) covering the seed at a uniform depth, which prevents birds, ants, and mice from carrying off a quantity, which they do when it has been sown broadcast; (3) it must be an advantage for the germinated seed to be well covered. I don't think the plant can thrive and mature so well if it germinates on top of the ground or when only half covered; (4) when the weather is boisterous broadcasting is difficult, but drilling is not affected thereby. It sometimes happens that after having sown a portion of land broadcast, a sudden change in the weather with heavy rain comes on, and it may be several days before you can get on the land; in the meantime the seed has germinated. This mischief is escaped in drilling, as it matters not how soon rain comes, as the seed is properly covered. Teams of four and six heavy horses tramping over the land after the seed has been sown is scarcely beneficial, this also does not take place where the drill is used.

Considerable discussion followed. Mr Robertson thought the great point with the drill was that the seed was put in at any depth required, and properly covered. The wear and tear would, he thought, be as great as with the broadcast sower. Mr. Wake said the advantages of the drill more than compensated for the extra cost, &c. Mr. Treloar considered, as a seed sower alone, the drill would pay better to use than the broadcast sower. Other members agreed.

### Maitland, May 7.

Present—Messrs. C. F. G. Heinrich (Chairman), T. Bowman, H. Pitcher, J. Hill, O. Treasure, J. Smith, J. S. McLeod, C. E. Moody, A. Jarrett, and C. W. Wood (Hon. Sec.).

CONGRESS.—Members suggested the following subject for discussion at the forthcoming Congress of the Bureau:—What commercial fertilisers should be used alternately on land required to be continuously cropped with cereals for at least three crops.

MANURES.—Considerable discussion took place on the best use of farmyard manure. Members were generally of opinion that, as but a small quantity can be produced on the farm, the best use for it would be to have one or two small paddocks that could be manured with it and cropped for green feed or hay. Mr. Hill wished to know if there was any drill capable of putting in a mixture of farmyard and other manures. [Unless the manure were thoroughly rotted and sifted it could not be used with any drill, and even in that condition it would be almost an impossibility to put on enough farmyard manure to be of any real service.—GEN. SEC.]

SILAGE.—Mr. Hill tabled splendid sample of sweet pit silage, on which his cows were doing well.

OFFICERS.—The following officers were elected for ensuing year:—Chairman, Mr. H. Pitcher, J.P.; Vice-chairman, Mr. J. Hill; Hon. Sec., Mr. C. W. Wood; Assistant Secretary, Mr. J. S. McLeod.

### Mylor, May 7.

**Present**—Messrs. W. H. Hughes (Chairman), P. Probert, W. Nicholls, S. Roebuck, F. G. Wilson, E. J. Oinns, J. Rosser, S. Pearce, W. T. Elliott, S. W. Jackman, R. S. Mundy, T. Mundy, Jno. Roebuck, W. G. Clough (Hon. Sec.), and seventeen visitors.

**GUMMING OF CHERRY TREES.**—This matter was again discussed, and it was decided to ask Mr. Oinns to read a paper on the subject at the Hills Conference in October.

**EXHIBITS.**—Mr. Probert tabled large samples of potatoes grown with the aid of Kangaroo Island guano; also white mustard, 2ft. 6in. high, being only six weeks' growth. It made a good fodder and was much earlier than barley. Mr. Oinns tabled good sample of Crookneck squash.

**CODLIN MOTH.**—Mr. Probert urged that united action should be taken to prevent the introduction of the codlin moth to this district. The gardens around Stirling were badly infested, but very little was being done to check the spread of the pest. It was decided to bring the matter under the notice of the Inspector of Fruit.

### Lipson, May 7.

**Present**—Messrs. F. S. Potter (Chairman), G. Provis, E. D. Swaffer, J. Wishart, W. Darling, S. Burt, E. J. Barraud, and H. C. Thorpe (Hon. Sec.).

**ANNUAL MEETING.**—Mr. H. C. Thorpe tendered his resignation as Hon. Sec. on account of his leaving the district. Messrs. F. S. Potter and G. Provis were re-elected Chairman and Vice-chairman respectively, and Mr. E. J. Barraud elected Hon. Sec. for the ensuing year. Other business of local interest was transacted.

### Bute, May 5.

**Present**—Messrs. A. Schroeter (Chairman), H. Schroeter, W. Sharman, E. Ebsary, W. Sluggett, M. Stevens, J. J. Chapman, S. Lamshed, D. Green (Hon. Sec.), and one visitor.

**MANURING.**—Mr. Ebsary wished to know whether the chemical fertilisers sown with seed in first week of March would have had any injurious effect on the seed which did not germinate until last week in April.

**FIELD TRIAL.**—Members reported favorably on land offered for use in connection with the forthcoming field trial of cultivating implements, and it was decided to accept with thanks Mr. J. Rooney's offer of this land.

**RAINFALL FOR APRIL.**—Recorded by Mr. Stevens, 1.770in.; by Mr. Schroeter, 2.025in.

### Mount Compass, May 10.

**Present**—Messrs. J. G. Youlton (Chairman), A. J. Hancock, F. Slater, W. Gowling, S. Arthur, M. Jacobs, T. Chaplin, R. Peters, W. Wright, H. McKinlay (Hon. Sec.), and two visitors.

**EXHIBITS.**—Mr. Chaplin tabled nice sample of Dart's Imperial wheat, and Mr. Gowling samples of Cleopatra and Stone Pippin apples.

**MANURING.**—Mr. Gowling initiated a discussion on "Are Ingredients injurious to the Human System transmitted to Vegetables manured with Commercial Fertilisers?" He thought there were, and advised members to use only such manures as were necessary to the full development of the crop. Most of the members agreed, and cited instances of potatoes being unfit for consumption and their keeping quality spoilt by over-manuring. Mr. Chaplin said he had

over half a ton of potatoes rendered unsaleable through too heavy manuring with farmyard manure. [That vegetables, especially potatoes, can be spoilt, as far as flavor and keeping qualities are concerned, by over-manuring, or using an unsuitable fertiliser, is well known; but they are certainly not made *injurious* to man or beast.—GEN. SEC.]

**BLACK SPOT OF POTATOES.**—Mr. Jacobs reported late crops of potatoes completely destroyed by "Black spot." They are attacked at time of flowering, and in a few days their destruction is complete. He intended trying spraying with Bordeaux mixture another time, and his neighbors will do the same. Members wished to know at what strength to use it. [The potato plants should be sprayed before any signs of disease appear, using 6lbs. copper sulphate, 4lbs. quicklime, and 4lbs. molasses or honey in 40galls. of water. Spray at intervals of about three weeks —GLN. SEC.]

### Mount Bryan East, April 30.

Present—Messrs. T. Best (Chairman), H. Wilkins, J. Prior, E. Prior, W. H. Quinn (Hon. Sec.), and two visitors.

**MANURES.**—A long discussion took place on the best way of using commercial fertilisers. [This discussion was doubtless interesting, but a simple statement that such was the case does not give members of other Branches an idea of how, in the opinion of the members of this Branch, commercial fertilisers can be used to best advantage. Will Honorary Secretaries kindly take this hint.—GEN. SEC.]

### Koolunga, May 5.

Present—Messrs. T. B. Butcher (Chairman), J. Button, J. Jones, A. Craig, J. Butterfield, R. Jackson, W. J. Jose, W. T. Cooper, E. J. Shipway, R. H. Buchanan, and G. Pennyfield (Hon. Sec.).

**DAIRYING.**—It was decided to ask the Minister of Agriculture to allow the Dairy Instructor to visit this district.

**"SOUSOFS"**—Mr. Button stated that this weed was spreading very rapidly in the neighborhood, and threatened to become a serious pest unless prompt steps be taken to cope with it. It was decided to bring the matter before the Central Bureau. [As this is not a noxious weed within the meaning of the Act, no compulsory action can be taken to have it destroyed. All landholders who study their best interests should, however, unite in an attempt to stop the introduction of this troublesome pest into uninfested districts. The weed can be destroyed by breaking up the soil and turning pigs or turkeys on to the patch. They will root up nearly all the tubers, and do well on them. Constant stirring of the soil to prevent the leaves maturing will also destroy the weed.—GEN. SEC.]

**POULTRY.**—Mr. Jose read a short paper, in which he strongly advocated poultry-keeping for farmers. Attention would have to be paid to them to make them profitable. He strongly favored the Minorca, a good layer and table bird. Farmers should obtain a pure-bred rooster to cross with their common fowls, and they would soon see an improvement in the quality of their stock. The Minorca and Langshan cross was also profitable. Fowls should not be kept after they are three or four years old. Mr. Jones said he found the progeny of a pure-bred rooster and common hens were mostly roosters. Mr. Butcher thought the Malay superior to the Minorca for all purposes. Some members recommended more shelter being provided, while others considered it a mistake to keep them too much enclosed, even in winter time.

### Gladstone, May 7.

Present—Messrs. J. Tonkin (Chairman), J. King, C. Gallasch, W. A. Worum, J. Brayley, B. Griffiths, J. Milne (Hon. Sec.), and one visitor.

CONFERENCE.—Appila-Yarrowie Branch wrote suggesting that the annual Conference of Northern Branches should be held at Gladstone at an early date. Members were agreeable to join in holding this meeting about February.

EXHIBITS.—Mr. Brayley tabled plant of Kaffir corn, about 2ft. 6in. high; they had made no progress for some months, and showed no signs of seeding. He also exhibited trailing plant, which was thought to be poisonous. [This plant is one of our most valuable indigenous fodder plants (*Atriplex semibacatum*), which, unfortunately, has been so nearly exterminated in our settled districts as to be a subject for suspicion when seen.—GEN. SEC.]

### Richman's Creek, May 2.

Present—Messrs. W. Freebairn (Chairman), A. Knauerhase, J. A. Knox, A. Nicholson, J. J. Searle, M. Hender, W. J. Wright, J. McSkimming, J. J. Gebert, and J. McColl (Hon. Sec.).

BROADCAST SOWING V. SEED-DRILLS.—A discussion took place on this subject. Mr. Wright said he found it a difficult matter to sow evenly with the broadcast sower, and had intended trying the seed-drill this season. The Chairman said he had managed all right with the broadcast sower, still he rather favored the drilling system, as there was a saving of seed, and the seed was put in at an even depth and covered properly. He did not think there was much need for fertilisers in their district; rain was what was most required. Other members had found it difficult to sow evenly, especially in windy weather, with the broadcast sower, and favored a trial with the seed-drill. It was decided to ascertain whether an exhibition of the drill could be arranged in the district.

BUNT.—Mr. Searle reported having sown good grains of wheat and bunt balls in separate drills, and both grew. [A big mistake.—GEN. SEC.] The plants differed very little from each other. Members were very sceptical as to bunt balls producing plants apart from the wheat, and undertook to test the matter for themselves.

STRIPPERS.—Mr. Gebert tabled drawing of swingle-trees on a stripper for four horses abreast, which he had been using successfully.

RAINFALL.—For three months ending March 31, 0.685in.; for April, 0.755in.

### Swan Reach, May 5.

Present—Messrs. P. A. Hasse (Chairman), J. O. J. Kohnke, A. G. Zadow, J. L. Baker, J. Scott, J. H. Hohnberg, F. Fischer, A. Fischer, F. F. Brecht, B. Schwartz, G. Greiger, and P. A. Beck (Hon. Sec.), and one visitor.

SEED EXPERIMENTS.—Mr. Baker reported Budd's rust-resistant wheat did well, but the grain was very small and not suitable for this district. Dart's Imperial wheat proved a good variety. The Chairman said the latter was very prolific, and stood the hot weather splendidly. Mr. Kohnke had good results from Golden Return, which, however, appeared identical with the variety grown here as Velvet Pearl. Neumann's wheat also proved very suitable. Mr. Baker also tabled sample of *Panicum crus-galli*, which did not suit the district, the rainfall not being sufficient. Members were of opinion that better results would be obtained from the cultivation of indigenous grasses.

**SAND IN HORSES.**—Mr. Hohnberg said he found that two pints of milk, warm from the cows, given through the nose of the horse, followed by active exercise, was a good remedy for sand. A couple of pints of soapsuds and a little salad oil was also effectual. Turning the horse on its back, and rolling it from side to side, should always follow physic for this complaint. With horses suffering from sand the hair on the loins appears smooth.

**MULLENISING.**—Mr. Hohnberg said his experience was that mallee cut in February would die off much sooner than if cut at any other time, but the shoots would grow again. Mr. Zadow considered February the best month to cut the shoots. He found swamp mallee the hardest and red mallee the easiest to eradicate. Other members agreed.

**DEEP CULTIVATION.**—Mr. Baker considered deep cultivation inadvisable in this district; for the first five or six years 3in. to 4in. was deep enough to plough. Members agreed, also that sandy land did not require rolling.

### Clarendon, May 12.

Present—Messrs. A. Harper (Chairman), J. Wright, J. Chapman, H. Payne, W. A. Morphet, J. Spencer, R. Hilton, D. Bilney, A. A. Harper, J. Piggott, and A. L. Morphet (Hon. Sec.).

**BRANCH WORK.**—Considerable discussion took place on how to make the meetings more interesting. It was decided that the best way would be to fix on the subject for discussion at least a month ahead, so that each member could come prepared to discuss the subject set down for discussion.

### Morgan, May 7.

Present—Messrs. Jackman (Chairman), A. Stubing, E. Jacobs, E. French, H. Frost, H. Dennis, and J. Wishart (Hon. Sec.).

**NEW PLOUGHSHARE.**—Mr. Dennis tabled new patent ploughshare invented and manufactured by Messrs. Hyatt & Dennis. This share has a cast socket to fit the plough, with a separate reversible steel plate to ship the same. It is claimed that this share is much cheaper and quite as effective as an ordinary steel share.

### Lucindale, April 30.

Present—Messrs. E. Feuerheerdt (Chairman), B. Feuerheerdt, S. Tavender, A. Matheson, E. Dutton, J. Bourne, A. Lobban, A. Dow, G. Newman, H. J. Deeble (Hon. Sec.), and one visitor.

**PESTS.**—Mr. Tavender reported that the common black aphid was making its appearance on his orange trees. Members reported that a case of apples from a district infested with codlin moth had been brought into this district. It was decided to inquire as to the proper steps to be taken in cases of this kind. [Unfortunately there is no power to prevent fruit being carried from an infested district to a clean one. All that can be done in cases like this is to get the local inspector to carefully examine the fruit, and seize any cases containing infested fruit.—GEN. SEC.]

**MANURING.**—A general discussion took place on the use of commercial fertilisers, all the members favoring their use. It was, however, considered that in order to protect themselves against fraud, purchasers should in every case insist on a guaranteed analysis being given.

**HYDATIDS.**—Some discussion took place on paper read by chairman at previous meeting on hydatids in stock.

**Narridy, May 7.**

Present—Messrs. A. Bairstow, (Chairman), J. Nicolson, R. Satchell, W. J. Martin, D. Creedon, and J. Darley (Hon. Sec.).

**MANURING.**—The Hon. Secretary thought that before the farmers went in for manuring they required some scientific education, otherwise they could not know in what respect their soils were deficient. As far as this district was concerned, rain was the element most deficient, and it was accordingly almost useless to use manures. Adding manures to the soil during such seasons as the past three or four was simply adding to the loss, owing to absence of rain during spring. Mr. Nicolson said he had tried superphosphate with several varieties of wheat, the result, except with bearded wheat, being failures.

**MULLENISING.**—Mr. Satchell said he mullenised a piece of land five years ago, between July and October, and there were stumps still alive. Portion cut after the harvest all died, though that mullenised during the winter produced a better crop than that done in the summer. Sheep were a great help in killing the shoots. If the shoots are allowed to grow for a year, the stumps are much harder to kill.

**Amyton, May 5.**

Present—Messrs. W. Mills (in chair), H. Gray, Thos. Gum, W. Hawke, S. Thomas (Hon. Sec.), and one visitor.

**EXHIBITS.**—Mr. H. Gray tabled samples of spring-hooks made from the steel bands used round bales of wheat sacks, both being considered by members to be very useful for reins or coupling. Mr. Hawke tabled tomatoes, Kaffir corn, and giant Honduras sorghum.

**SEED EXPERIMENTS.**—Mr. Hawke reported following results of seed experiments during past year :—Giant Honduras sorghum, irrigated, 7ft. to 8ft. high; Red Kaffir corn, irrigated, 5ft. high, not irrigated, 3ft., large ears; Holcus, Red Amber cane, and White Kaffir corn, not irrigated, failed to mature; Chufa did well, also Soja bean, a good bearer and hardy; Popcorn failed to set heads; Peanuts only bore a few seeds; Mammoth Ironclad, Cuban Queen, and McIvor Sugar, watermelons, all of good flavor and fair size; Melrose and Grand Rapids, sweetmelons, good bearers; Saxon Squash marrow, splendid flavor, good bearer; Golden Oblong, good, one plant bore 42lbs. of fruit. Tomatoes—Imperial, Matchless, and Pineapple, all of good flavor; Early Ruby, very prolific; Golden Drop, very hardy, almost frostproof. Cucumbers—White Wonder and Fordhook White Spine, good bearers and splendid flavor. Other members reported failures with most of their seeds. The Hon. Sec. found Dart's Imperial wheat ripened a week later than Steinwedel, the heads were small and the grain shrivelled.

**PROFITABLE FARMING.**—Mr. Gray read a paper on this subject, of which the following is the substance :—

There are many ways of putting in the seed, but from his experience he considered that for this district ploughing in the seed with a skim-plough was one of the best. In dry seasons wheat covered fairly deep did much better than seed harrowed or scarified in. Then with the skim-ploughs, half a bushel of seed is quite as good as three-quarters harrowed in; no small saving at present price of seed. He could put in quite as much in a day with a skim-plough as with the harrows using the same number of horses in each case. Land put in with the skim-plough need not be harrowed after dry weather. Unless they were going to use manures, the skim-ploughs would be nearly as good as the seed-drill, and for manures, the boxes could easily be fixed on the ploughs. Such would be a more serviceable implement for working the fallows, and the land requires no previous preparation as with the drill at seeding time. Last season he got 1 bush. to 2 bush. per acre from land on which the seed was ploughed in and less than half a bushel from that harrowed in.

In this district we should put at least half of the crop on fallow land. We should also use the binder and header to provide a good supply of horse-feed, and save cutting so much of the

crop for hay. He would not, however, recommend the binder for general use in place of the stripper. The farmer should rear his own horses, breeding from the best, as a good colt costs no more to keep than a bad, and is readily saleable. Combine sheepfarming with wheatgrowing, Merinos or Merino Shropshire cross being the hardiest and best for the North. Sheep will pay better than dairying in this district. Keep a few cows, sufficient for the household supplies, but only keep good ones. Keep poultry. Get a suitable pure-bred rooster and place with four hens, and you will get good crosses. It is a good plan to make a portable house in which the fowls can be taken on to the paddocks after stripping. They will pick up all they need for some time. Do not, however, attempt to keep more than you can feed properly.

A good discussion ensued. Members admitted the value of the paring ploughs for covering the seed, but did not think so much land could be put under crop as quickly as with six harrows. Mr. Gray said he could put in fifteen acres daily with the plough drawn by six horses, and cutting 7ft. wide. The horses walked much quicker with the plough than with harrows. He considered the Shropshire preferable to the Lincoln for crossing purposes, as they were very hardy and quiet.

### Mount Gambier, May 14.

Present—Messrs. J. Umpherston (Chairman), J. Watson, D. Norman, sen., W. Mitchell, T. Edwards, T. H. Williams, W. Barrows, M. C. Wilson, J. Bowd, J. C. Ruwoldt, G. G. Collins, J. Dyke, and E. Lewis (Hon. Sec.).

**MANURING.**—Mr. Ruwoldt tabled sample of bonedust manufactured by himself from green bones, and ground fine enough to pass through the drill. He believed he could sell locally all he could manufacture. Members congratulated Mr. Ruwoldt for his enterprise in starting a new industry in the district, and believed it would prosper, as the residents would have confidence in an article manufactured by one well-known to themselves.

**FRUIT EXHIBITS.**—Mr. Wilson tabled splendid Portugal quinces, Uvedale St. Germain pears, Dunn's Seedling and London Pippin apples. The largest quince weighed 1½lbs., and the largest pear 2½lbs. Mr. Barrows tabled pear for identification.

**ACTINOMYCOSIS.**—Mr. Williams, Stock Inspector, tabled lower half of head of bullock, showing the ravages caused by the ray fungus of actinomycosis eating away the bone. In reply to question he said the disease was not classed as contagious, and it was not known exactly how it was spread. A good many cases had been reported in the district, the lower jaw being the principal seat of attack. A blow could not cause similar effects. An abscess would result from injury, and when it had run its course the beast would soon recover. The meat of affected animals was not injurious, and the disease itself could be cured in its early stages by iodide of potassium, taken internally.

**LICE IN SHEEP.**—Mr. Williams said lice in sheep were making their appearance again. He had had to prosecute some owners for neglect to carry out the law, and other offenders would be similarly treated. There were dips that would kill the lice, and stockowners must treat their sheep. Two dippings were absolutely necessary. This cost something; but it was profitable work, as lice caused loss and damage to the wool. Some feared that dipping would stain the wool and injure its sale, but a wool expert told him that the dip stains did not detract in any way from the value, and buyers would give as good price as for the cleanest of wool. Mr. Edwards said he dipped twice last year, and believed it paid him well. He used Cooper's dip, and the wool was not discolored in the least. Mr. Williams said the experience at Moorak was the same; 2,000 sheep were dipped twice last year, and the wool was perfectly clean and white.



**Carrieton, May 19.**

Present—Messrs. J. McNaughton (in chair), W. Venning, N. Travers, J. F. Fisher, G. Martin, H. Menz, J. B. Harrington, W. J. Gleeson, and J. W. Bock (Hon. Sec.).

**SEED DRILLS.**—It was decided to endeavor to arrange for a field trial of seed drills near the Carrieton railway station, Mr. W. J. Gleeson offering a suitable piece of land for the trial.

**FORESTRY.**—Mr. Travers reported that trees obtained from the Forest Department last year did well until November, when the locusts came in swarms and destroyed all of them. Mr. Harrington said a fair percentage of his trees made a start; but the dry season had killed nearly all, only about 8 per cent. being alive. Mr. Manning said he had best results from pepper trees (*Schinus molle*). Mr. Martin was appointed to take charge of trees required by members from the Forest Department.

**Woolundunga, May 16.**

Present—Messrs. J. H. Michael (in chair), W. McLaren, J. Grunike, A. S. Gunning, J. S. Partridge, N. Rogers (Hon. Sec.), and one visitor.

**FRUIT-GROWING.**—It was decided to ask the Inspector of Fruit to visit the district and give lectures and demonstrations of pruning, &c. It was decided to have a question-box night.

**EXHIBITS.**—Mr. Gunning showed samples of raisins and dried apricots from Renmark.

**Penola, May 14.**

Present—Messrs. D. McKay (Chairman), W. Miller, D. Balnaves, S. B. Worthington, E. A. Stoney, L. W. Peake, W. H. Pounsett, J. W. H. Sandiford, and T. H. Artaud (Hon. Sec.).

**RAINFALL.**—The Hon. Secretary reported that the rainfall recorded for year to date was 3·440in. against 3·870in. for same period last year.

**DONATIONS.**—The Hon. Secretary tabled various publications received, including copies of "Western Australian Settlers' Guide," for which the Department of Agriculture of that colony was accorded a vote of thanks.

**FENCES.**—Mr. Stoney asked which fence would be the cheaper to erect—redgum posts, with five wires, and top barbed, or angle-iron posts, 18in. in ground, 3ft. 6in. out, five wires, and top barbed, posts to be 9ft. apart.

**Riverton, May 6.**

Present—Messrs. W. J. Andrew (Chairman), F. Chapman, T. Gravestock, M. Badman, D. Kirk, A. Hannaford, C. C. Castine, Dr. Allwork, and H. A. Hussey (Hon. Sec.).

**CODLIN MOTH.**—Messrs. Andrews and Gravestock, honorary fruit inspectors, reported having visited gardens and fruitshops in the district. They found apples in the shops which had been infested by codlin moth caterpillars, and had cautioned the shopkeepers against receiving any infested fruit. Considerable discussion took place on this and other matters of local interest.

### Angaston, May 21.

Present—Messrs. R. Player (Chairman), A. Friend, J. Vaughan, A. Sibley, P. Radford, W. Sage, W. Sibley, E. Thamm, and E. S. Matthews (Hon. Sec.).

**FRUIT-TREE PRUNING.**—Mr. W. Sage read the following paper on this subject :—

The above subject is one full of difficulty and uncertainty, as there is no reliable guide to scientific knowledge on tree-pruning. We can, therefore, only fall back upon the knowledge gained from experience by practical gardeners in following up systems that have given best results to them. Here we are met by the difficulty that nearly all differ somewhat as to what is the best system. I will, therefore, give as nearly as I can my own opinion, based on experience and observation of methods adopted by others.

The object is to keep the trees symmetrical and vigorous, the crops good and regular, and the fruit fine in quality. One thing we will doubtless be all agreed upon is that different varieties of fruit trees require different systems of pruning, and will therefore need to be dealt with separately, and we will therefore take them in following order :—

**Peach.**—This requires little pruning when young, just a little thinning out of the centre branches and trimming back those that project in such a way as to interfere with the cultivation being all that is necessary. At about four years after planting, begin to head back in order to encourage growth of young wood about the body of the tree. In pruning a matured peach tree it should be the object of the pruner to train the branches not less than from 15in. to 18in. apart. The peach bears its best fruit on the new wood, and fruit spurs should be from 4in. to 6in. apart, and be shortened to four to six buds. No fear need be felt of killing the shoot as there are always two buds at the base of each shoot from which young bearing wood for following year may spring. Peach trees pruned thus have given crops of fine fruit every year where the soil is good, instead of, as is often the case, bearing very heavily of indifferent fruit one year and nothing the next. I may say, Professor Perkins, in speaking of pruning this tree, said it was the only tree of which pruning lengthens the life.

**Apricots.**—These require hard pruning when young, as if left unpruned they quickly become bare of fruit spurs about the body of the tree. Started with a stem of 15in. to 18in. high from a single rod, rub out all but three shoots first year, and prune these shoots to 9in. to 12in.; next year leave six shoots same length, and continue pruning thus till fruit yield begins to check the vigorous growth of tree, after which branches should be thinned to not less than 15in. to 18in. apart, and the young wood be cut back to 2in. or 3in. in length. In pruning fruit spurs or growth on which there are buds of blossom, care should be taken to cut outside a leaf bud, as otherwise the shoot will die. The apricot as a rule bears from spurs of last year's growth on the previous year's wood.

**Plums.**—I have not had a great deal of experience with these. The early training should, I think, be something similar to apricots for, say, three years, after which topping should be discontinued, and thinning and taking out superfluous branches only be done. I do not approve of leaving them unpruned altogether, as the crops are very irregular and fruit sometimes inferior owing to overbearing.

**Apples.**—Prune as for apricots for four years, after which topping should be discontinued and shoots just thinned a little to admit of formation of fruit buds. The branches can then be thinned to 15in. to 18in. apart, and will then set fruit which will bend the branches to a more or less horizontal position, and which is most favorable to formation of healthy fruit buds and good even crops of fruit. The lower branches can be cut out of the way as required for purposes of cultivation, and as the branches bend outward and downward fresh wood grows freely from the bend of the branches to take their place in the centre of the tree. When any cutting is done the branches should be taken right out, and it is best to have at least 15in. to 18in. of clear space between the branches. Topping a bearing tree stunts the growth and checks its vitality.

**Pears.**—These require little shaping as the growth is naturally symmetrical, and just to take out crowded and cross branches is all that is necessary. When in bearing a vigorous thinning is advisable to prevent over-cropping, and consequently inferior and irregular crops. There is an old pear tree at Gawler Park which has not been pruned in any way for years, and from it fifty cases of pears were gathered last year.

I have given here an outline of what seems to me to give satisfactory results in our district, but I am conscious that varying conditions of climate and situation would sometimes require different and special treatment. At best I am but a learner, as are most of those engaged in orchard-culture in South Australia.

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[A NEWSPAPER

VOL. I.

### NOTES AND COMMENTS.

The weather during the past month has been very favorable, and the break up of the long continued drought in the North has greatly improved the prospects for the coming season. The rain during the early part and the middle of June extended all over the drought stricken agricultural country and well into the pastoral districts, and the prospect in general is more promising than we have been blessed with for many years. Generally the rain during the month has been the best experienced since 1890, the whole of the settled districts having had a thorough soaking. Dams and tanks have been replenished, and but for the unfortunate fact that but little water has been caught in the Beetaloo reservoir, we would not hear of any water troubles for some time. The rainfall recorded at the following stations during June will give a good idea of the widespread and soaking nature of the rains:—Hawker, 4.750in.; Quorn, 4.070in.; Carrieton, 3.440in.; Petersburg, 3.080in.; Port Germein, 2.170in.; Port Broughton, 3.160in.; Laura, 3.510in.; Kadina, 3.270in.; Maitland, 4.680in.; Minlaton, 3.950in.; Burra, 2.880in.; Eudunda, 3.460in.; Morgan, 2.600in.; Mannum, 3.070in.; Riverton, 3.510in.; Angaston, 2.920in.; hills round Adelaide, 5in. to 9in.; Willunga, 5.100in.; South-East, 4in. to 5in.; West Coast, 2½in. to 4½in.

In every part of the colony during the past month millions of gallons of water have run to waste where less than two months ago in many parts the scarcity of water was the cause of great trouble and expense. There can be no doubt that sufficient attention is not paid to the conservation of water in this colony. In the northern districts especially there are many places where, by half a dozen or more farmers combining, they could conserve sufficient water to place them beyond actual want, and in fair seasons could utilise the surplus for the growth of vegetables, fodder crops, &c., on a small scale. This matter of water conservation deserves the most earnest consideration, and it is hoped that during the coming year some good work will be started in this direction.

Very few of our cultivators seem to be aware of the great benefits of winter irrigation for summer growth, whether for annual crops or in the orchard or vineyard. By giving the subsoil a good soaking about the end of July or August, and keeping the surface broken to prevent loss of moisture by capillary attraction, it is surprising what little rain is required to bring the crop to maturity. In the *Journal of Agriculture* for February and June of this year

we published illustrations showing the benefits of winter irrigation of apricots and apples, and similar results have been obtained with vines, peaches, and other fruit trees. With summer crops, such as maize, sorghum, cow peas, lucern, &c., the result of winter irrigation is also very marked, and many farmers who never grow these crops could, by taking the trouble to turn the surface water on to a suitable piece of land during August or September, grow a quantity of green stuff for their stock during late summer and autumn months. As an instance of this, Mr. H. Carn, of Moculta, forwarded in June of this year samples of sorghum grown on land that was flooded in June of previous year, sown in September, and, with only 2 in. of rain in five months, grew to height of 4 ft. 6 in. and matured seed.

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A rather unusual occurrence is reported from the Broughton district. A farmer with 200 acres of early-sown wheat reports that the grain germinated after the April rains, and made fair progress. In consequence, however, of the warm, mild weather during May the wheat is fairly out in ear, and the owner is in a quandary as to what treatment to pursue. The only course possible seems to be to put sheep on to feed it down, and Professor Lowie has advised to that effect.

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During the past six months the outlay of South Australian farmers on commercial fertilisers has scarcely fallen short of £70,000, and it is of the greatest importance that the best returns possible should be obtained for this outlay. With this end in view the Fertilisers Act of 1896 was passed, and it provided that all vendors of a manufactured fertiliser *must* give to the buyer a guaranteed analysis of such fertiliser, and are liable to a heavy penalty if they neglect to do so. Most of our merchants have given such guarantee, and to do this have themselves purchased in bulk on analysis. Some, however, decline to give any analysis, and, possibly because of this very fact, are able to sell at a lower rate than the others. Notwithstanding the repeated warnings of the Professor of Agriculture and the Agricultural Bureau, many farmers have purchased these manures without an analysis, and if they find that they get no satisfactory return for their outlay they have no one but themselves to blame. For the sake of an apparent saving of a few shillings it would seem that a large number of our cultivators will risk the loss of as many pounds, as not only is there the actual monetary loss involved in the purchase of the fertiliser, but there is the loss of time and labor involved in putting such fertilisers on the land.

The question of a standard weight for the bag of chaff is a matter that has caused considerable discussion amongst chaff merchants and buyers. Many merchants complain that although a bag of chaff is generally understood to be 40 lbs., some unscrupulous dealers put less than this quantity in the bag, and consequently are able to sell at less per bag than the one giving full weight. As they sell by the bag, and not by weight, the buyer has no remedy when he finds he has been defrauded. The only remedy for this, according to many, is to fix the standard weight of a bag of chaff at 40 lbs., so that it would be unlawful to sell any less quantity in the bag. It appears, however, that the simpler way would be for the majority of the merchants to guarantee their bags of chaff to contain the full weight, and bring pressure to bear on the retailers to deal with no one who declines to give such guarantee. This would soon have the desired result, whereas an attempt to get a standard fixed by law would not only be an expensive matter, but it is very doubtful whether the majority of our legislators could be convinced of the necessity for such action.

It is a fact, which can be proven from British market reports, that Manitoba flours realise from £1 15s. to £2 per ton higher prices than can be obtained for South Australian flours, and yet the red flinty wheats of Canada and the United States would be despised and altogether rejected by farmers, wheat-buyers, and millers in South Australia. Red Fife, Blount's Lambrigg, Duluth, Manitoba, and other flinty wheats have been introduced here, have been tried, and condemned; but they are all strongly rust-resistant, prolific, and yield a strong flour with a high percentage of gluten, whilst the soft wheats that are in high favor locally are very deficient in gluten, and bring lower prices in the British markets. Mr. Farrer, of Lambrigg Farm, Queanbeyan, New South Wales, has developed a variety of Blount's Lambrigg which is a fortnight earlier than the original variety, and thus one objection to its cultivation has been removed. There is, in the Museum of the Agricultural Bureau, a loaf of bread made from the old Blount's Lambrigg wheat some three years ago. The baker said that it was a more profitable flour to deal with than that made from soft wheat, and made a sweeter and nicer bread, but that it requires skilful treatment to produce a white loaf. The bread is not dead white in color, but has a very slight yellowish tint, which is more attractive. Mr. M. Kahlbaum, the head miller for the Adelaide Milling Company, Port Adelaide, strongly advocates the cultivation of the wheats above mentioned, and has supplied Mr. R. Marshall with genuine samples for trial. If some 300 bags of either one of the varieties could be supplied, he would be in a position to prove the superiority of the flinty wheats, which are slowly supplanting our soft wheats in the British markets. Mr. Kahlbaum states that from a miller's point of view Blount's Lambrigg is one of the best wheats ever grown in South Australia, and "Kestrel" (offspring of Blount's Lambrigg) is earlier and of even greater strength in the flour, but the grain is very small.

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Lucern for dairy cows should be cut and allowed to wilt on the field for six to eight hours before being fed to cows, in order to prevent the "lucern taint," which generally is present when the cows are allowed to graze upon growing lucern. If milk shows any taint from cows feeding upon fresh lucern or any other plant it can be removed to a considerable extent by running the milk (directly it is drawn from the cow) over a Lawrence cooler.

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During July some tobacco seed should be sown in a bed that can be sheltered from night frosts during July. Make a bed of rather sandy soil, place a lot of brush on it, burn this, and then dig it in, mixing the ashes well with the soil. Sow the seed thinly on the surface and barely cover with very fine mould, beat down the surface lightly with back of spade. Put stakes around the bed and cover over the top with calico at night. Water with sun-warmed soft water in the afternoon every day if necessary. The best soil for tobacco is a light sandy loam, with a rather stiff subsoil. Fresh wood ashes may be used with advantage for this crop, which requires a deal of potash. When planting, after danger from frost is over, make the rows 3ft. apart with 15in. between the plants. For coarse sorts, 4ft. x 18in.

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One of the oldest plantations of olives is that at Cummins, near Glenelg, now owned by Lady Morphet. Another smaller one was early established by the late J. Peake, at Clarendon, which produced about 5 tons of olives this year. The late Dr. George Mayo in early times planted a lot of olives in Adelaide,

and another deceased gentleman (Mr. Barnard) planted a lot at Walkerville many years ago. A very old tree, the first in the colony to bear fruit, was planted by the late Mr. George Stevenson, at Lower North Adelaide, and this is now of immense size; he also planted another at Leawood, Devil's Elbow, Mount Barker-road, which probably is the largest olive tree in Australasia. The South Australian Company, in 1844, introduced a number of the best French varieties, which were planted in the Hackney garden by the late F. M. Bailey. Since then Sheriff Boothby, C.M.G., Sir Samuel Davenport, K.C.M.G., the late Sir George Kingston, K.C.M.G., Mr. Thomas Hardy, Messrs. Joseph Crompton and Co., Mr. J. H. Angas, at Hill River, near Clare, and the Adelaide Corporation have planted olive trees more or less extensively. These various gentlemen procured approved varieties from South of France, Italy, and Spain. Many seedlings have been raised and planted, most of them of little value. As a rule, where only a few trees are planted the fruit is allowed to waste, and the trees grow wild, with no attention whatever. The olive seems to thrive almost everywhere in the colony, and bears well on the plains.

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On Yorke's Peninsula, as well as in other parts of the colony, in certain orchards the apricot trees are dying after suffering the following symptoms:—One branch slowly dies off, the leaves turn black on the edges and curl up; next year several more branches are similarly affected, and the tree dies on the third year. Remedies tried—1. Amputating branch when disease is first seen, but this causes the disease to spread more quickly. 2. Forking in manure; this has no effect in staying disease. When the trees are dug up there is no indication of borers or other disease of the roots; the soil varies in the different localities and is evidently not the cause of the trouble. Microscopic examination fails to disclose any fungus disease. Possibly muriate or sulphate of potash and superphosphate applied separately at intervals of one month would act beneficially.

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In last month's issue there was a reference to the Florida Velvet bean, a new fodder plant of reputedly great value. In the May issue of the *Queensland Agricultural Journal*, Mr. A. H. Benson writes of experiments with this plant. It appears likely to be of great value where the cow pea thrives, as it gives a heavier yield of green feed than that plant; but it is of no value for culinary purposes. It is very doubtful whether the Velvet bean will pay to grow in South Australia, except in the moister and cooler parts. Generally our summer is too hot and dry for this class of plant. As far as can be ascertained the seed is not yet obtainable for commercial purposes anywhere in Australasia.

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The present issue completes the first volume of the *Journal of Agriculture and Industry*, and with the next issue will be published an index of contents to be bound along with the twelve previous issues. The Editor gratefully acknowledges the many highly commendatory criticisms passed upon his work by the numerous kindred publications in the adjacent colonies and abroad as well as in our own colony, and also by subscribers and other recipients of the *Journal of Agriculture and Industry*. His grateful thanks are also accorded to the numerous able and highly-talented specialists whose writings have so usefully graced the pages of this publication during the past year, and he looks forward with bright anticipations for a continuance of their most valuable and practical assistance. To members of the Agricultural Bureau all ever

South Australia the Editor expresses his heartfelt thanks for literary favors received and hints forwarded respecting improvements in the management of the *Journal*, and he desires a continuance of all favors, especially in regard to improved practice in all agronomical pursuits. Illustrations of utilised waste substances, helps for farmers, handy helps in the household, &c., will always be acceptable, and will be published when possible. The *Journal* has already secured a very wide circulation, but that can still be most usefully extended largely if each reader who approves of it will urge a friend or two to place their names on the subscribers' list.

The subscription to the *Journal of Agriculture and Industry* is 5s. per year, *strictly in advance*. For that sum it will be posted to any part of the world where postal facilities exist. At the conclusion of each volume an index will be prepared, and will be published along with the next following issue. This will be free to all continuing subscribers, but postage will be required when the index alone is wanted. Subscriptions should be paid in cash at the office of the Agricultural Bureau, in Adelaide, or by postal note addressed to the publisher, at the same office. A few complete files of the first volume can be secured upon payment of 5s. each set, as above.

## ECONOMIC BOTANY.

### I.—THE CAMPHOR TREE.

By MAURICE HOLTZE.

The camphor of commerce is in reality an oxidised oil; out of camphor oil, through the action of the oxygen of the air, camphor is formed.

There are several plants which produce camphor; of these *Dryobalanops aromatica*, a large tree growing in Borneo and Sumatra, produces the Sumatra camphor. This highly-esteemed camphor is seldom found in commerce, as the Chinese use all of the products in their *materia medica*. A second and inferior sort is produced by an East Asian shrub—*Blumea balsamifera*. This camphor, called by the Chinese "Ngay," is used by them in the manufacture of their Chinese ink, but in commerce it is hardly known.

The camphor of commerce, and the only one which interests us here, is produced by the camphor laurel (*Laurus camphora*), also known botanically as *Cinnamomum camphora* and *Camphora officinalis*. This tree, called by the Japanese "Kusu-no ki," grows spontaneously on the coastal parts of East Asia, from Cochin China up to the mouth of the Yang-tse-kiang, including the islands of Hainan and Chusan. Formosa, the isles of Lin-kin, Kin-shin, Shikoku, and Kishin. It grows, therefore, between the 10th to 34th degree N. latitude. From this it would seem that nearly all parts of Australia would be suited for the cultivation of this tree. This is, however, not so, as it requires a fair amount of moisture, together with a well-drained soil; and in South Australia its culture will be fairly restricted to the hills country, where, without question, it will flourish on the stony hillsides and in the gullies. Yet, from the large tree in the Botanic Garden and numerous medium-sized ones in the Botanic Park, it would seem that even in the plains its cultivation might be successfully tried. This cultivation is of the simplest. The fresh seeds, which are of the size of a pea and somewhat resemble a very small olive, will germinate well in any good soil, and the plants will be ready in a year's time to plant out. The growth of the camphor laurel is rather slow, and a good many years have to

elapse before the trees are fit to be cut down for camphor. In Formosa and Japan, from whence the best camphor of commerce is obtained, very often the trees are left until they are 100 years old, at which age they are said to be richest in camphor. The trees are then cut down, preferably in winter, at which time more solid camphor and less camphor oil is obtained. The wood is chopped up in chips, which are put in a hogshead with perforated bottom. This is put over a vessel wherein water is kept boiling, and the steam of the water passing through the chips extracts the camphor oil out of the chips. The steam enters through a bamboo tube into a cooler, where the camphor oil is liquefied. This cooler consists of a trough standing in another trough filled with water, and covered with another similarly filled with water. Boards are fixed into this cooling trough from alternate sides, which force the camphor-laden steam to travel in zigzag, and thereby effects a more complete cooling.

The distillation of a cask of  $2\frac{1}{2}$  cwts. of chips takes about twenty hours, and produces about 5lbs. to 6lbs. of solid camphor. The camphor oil which results as a by-product of the distillation can be used in the manufacture of varnish, and quite recently it has been found that, by distillation, solid camphor can be extracted from this oil. By this means about 8lbs. of camphor are obtained out of  $3\frac{1}{2}$  cwts of oil.

There is no doubt that the above crude and wasteful distillation would have to be replaced here by more modern apparatus, say in metal retorts by heated steam from a steam boiler and proper metal coolers, by which means larger quantities of wood could be treated in a shorter time and with less waste.

Besides camphor, the camphor tree produces an excellent timber, out of which the celebrated Chinese camphor-wood trunks are manufactured, which are believed to be proof against all insects.

It seems to me that it will be worth while to cultivate the camphor tree in our hills, where it will, without doubt, flourish. It is a long time to wait for a return, but, on the other hand, there is no labor whatever after the first couple of years. Hill-sides which are otherwise useless for cultivation can be planted, and the children of the man who does put in a number of trees now will thank him for his forethought in years to come.

## FORESTRY.

### NOTES ON TREE-PLANTING.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

#### The Importance of Proper Cultivation.

In my previous remarks on the subject of the influence exerted by local conditions on the growth of trees, brief though they were compared with the amount of information available on such an interesting question, enough was said to show how far-reaching is the force exerted by what seem to be but moderate factors in the surroundings of tree life in the natural forest, or in any common set of conditions not directly brought about by any interference from the hand of man. A little reflection will soon enable us to discover that by making use of the facts which nature presents to our view we can often succeed in greatly modifying conditions that may at first appear unfavorable, if we are able to direct operations from the start—as is the case with artificial plantations—though we may not be able to produce much alteration in the surroundings of trees in their natural habitat in the forest.



The question as to how the greatest amount of moisture can be stored up in the soil for the support of the young trees during the burning atmosphere of our summers demands undoubtedly the prime consideration when planting operations are contemplated; and it is in connection with this very vital matter that the most careful study is required in order so to modify any existing conditions in the locality selected for planting which may prove prejudicial as to ultimately ensure successful results. There are, of course, a few exceptional instances where small lots of young trees can be artificially watered, and thus assisted to pull through the trying drought of summer; but, speaking in a general way, water is not available, or even should it be plentiful labor may not be, and after the spring rains are over it may be six months or more before any rain falls to refresh the parched vegetation. Sometimes, as it has unfortunately happened for the last year or two, the spring rains utterly fail, and the winter rains also are far too light. Hence the great importance of getting the land well opened by cultivation over as much surface area as possible to catch *all the rain* that can be secured! The question of cultivation is quite a secondary one in more temperate climates, simply because the rain is always coming down nearly all the year round there. There are brief intervals when it stops for a while, but so continuous is its occurrence that visitors to the old country, for instance, invariably return with the fixed impression that "it is always raining." It follows from this that the soil is for by far the greatest period of each year in a thoroughly moist condition, readily permeable by any roots. The rough stony hills too are moist and soft wherever any soil exists, and, in addition to this, the atmosphere is moist and vapory.

Sometimes, should the winter be a severe one, the moisture in the atmosphere gives place to a clearer air: but the moisture in the soil, under the action of frost, becomes a most powerful factor in fitting the ground for supporting plant life, and the snow, while enriching the soil, largely adds to its stores of moisture during the ensuing thaws. What a vast difference is at once apparent on an intelligent comparison of these conditions with those generally existing here in South Australia. In England, Scotland, or Ireland abundant moisture in soil and air practically all the year round—for taken altogether there are but three or four months of anything approaching fine sunny weather—whereas here the reverse is correct, three or four months at the utmost (generally much less) of anything like wet weather, the remaining period being invariably dry, and often for protracted periods intensely hot for plant life; not the tropical vapory heat that produces some of its more luxurious forms, but the arid burning heat that specially tests its vitality. It is this dry heat that, in the absence of moisture, literally bakes the surface of some soils as hard and impenetrable as rock, and hence it happens that very much of the rain that falls runs *off* the land, in its natural untilled state, instead of running *into* it and soaking well down into the subsoil. Now, this is a very unfavorable state of things for tree-growing, and if a small hole be dug in this hard land, just big enough to cram the tree into, *as is far too often the case in this colony*, and then the tree is thereafter left to take its chance without any further attention, only one result can be expected in the vast majority of instances, and that is that *the tree will die*. The only genuine way to render these unsuitable conditions fit for supporting tree life, and bringing it on to ultimate satisfactory development, is to properly *cultivate the land*. It has been seen that much of the rain runs *off* the hard surface of a stiff soil; but when that soil is broken up by cultivation it can run down *into* it, and thus prevent the heavy loss of moisture formerly caused by the impermeability of the soil. The vast alteration created by breaking up various areas of land in this colony has frequently been plainly demonstrated by the fact that in some creeks that were for the greater part of the year quite dry *before* cultivation, the water now runs nearly all the

year, showing that the rain water, instead of rushing violently away in floods from the hard untilled ground, now soaks into the cultivated land and only gradually finds its way into the creeks through the lower levels of the soil.

Now, if, as is clear from the foregoing fact, the cultivated land conserves more moisture than uncultivated, it really comes to this, that, given a 20in. rainfall in any locality, and a loss of 25 per cent. of it in consequence of the failure to readily absorb it, we shall really save that percentage by breaking up the soil for its reception, and thus prevent the heavy discount in the value of the annual rainfall that would otherwise occur. I have dwelt somewhat at length on this aspect of the matter, because it cannot be too strongly emphasised that a sufficient supply of moisture is the pivot upon which the whole question of success in tree-planting in this colony turns. If under the existing surroundings on any given site a fair amount of moisture is not obtainable, and if it is impossible to modify those conditions so as to render them more suitable, then it is practically useless to attempt to plant. The question of quality of soil, *i.e.*, whether it be rich or poor for the growth of farm produce, is not of so much importance, because trees do not in general require so much in the way of manure; but the more vital point is *whether the soil can properly retain the moisture when it gets it*, and hence it happens frequently here that some of the best land, being retentive in character, is better suited for trees, because it is better able to retain the moisture than the lighter soils which are of a more porous nature. Soils of this latter kind, even in a good district for rain, often disappoint the planter—they do not keep the rain when they get it; and when they are situated in localities where rain is less frequent they do not get it to keep, and are only able to support a class of tree growth which, though specially fitted to cope with the existing conditions, can only be considered of inferior value for all ordinary timber demands.

With reference to the actual work of cultivation, it will not be necessary here to go into minute detail, as every intelligent farmer and landholder, when once the vital importance of thorough cultivation is recognised, will easily see how far it may be desirable to adapt general practices to his particular surroundings as to soil, &c. Speaking broadly, one great thing is to get the land opened up *as soon in the autumn as the season will allow*. In some parts the present has been a favorable season for early ploughing, but this does not always occur. The excellent rains which have lately fallen should now render cultivation possible, even on virgin soil, over a wide area, and the sooner it can be done the more moisture will be secured. As a rule about 6in. is a fair depth to plough, and gives very satisfactory results in tree-planting. It is worth noting that the general requirements for cultivation for trees need not be so exacting as to fineness of tilth as is desirable in the case of farm crops, where seed has to be sown. A good stump-jumping plough, properly handled, will generally do work quite well enough, even in rather rough ground, though it may not possibly compare favorably with the work of an ordinary plough on even land in point of appearance. The main thing is to open up the land faithfully to a suitable depth, and the rains will then get a chance to do their part. Over limited areas harrowing may be done to advantage, but in more extensive operations would generally prove too costly, seeing that good results can be secured without in most instances. In special cases, where it is particularly desired to push on the growth of a small clump of trees, trench ploughing may be resorted to with considerable benefit. In nothing does the old adage, "Well begun is half done," hold good more than in connection with good cultivation for tree-planting. It matters not how good the trees may be, or however skilfully the mere mechanical work of tree-planting may be done, if the work of cultivating be omitted, or carelessly slurred, the trees will get a bad start, and have hard work to succeed at all.

Deciduous trees and pines of various sorts should now be planted on such sites as to suit their respective requirements, and it will be well to remember that many pines, being denizens naturally of elevated land amongst mountainous districts, are unfitted for the hotter and more trying climate of the plains. The recent very dry season has forcibly demonstrated the danger of planting them in the low-lying parts. As frosts may be expected with more or less severity during July, it will be well in many places to delay planting gums, especially the sugargum, till the risk of frost is reduced to the minimum, more particularly if the site selected be situated in low, moist valleys where frost generally strikes hard.

## POULTRY NOTES.

*Written for the "Journal of Agriculture and Industry."*

By D. F. LAURIE.

GENERAL NOTES.—The magnificent rains that have recently fallen throughout South Australia have had a great effect on the poultry market as regards breeding stock. On all hands the greatest activity prevails. Some months ago I predicted that, should the year begin auspiciously, a heavy demand for breeding stock of approved varieties would surely set in. This prognostication is now being justified; many leading breeders tell me that they have been inundated with orders, and that in many cases their available stocks are sold out. Within the last few weeks I have had more inquiries, personal and by letter, than ever, and, thanks to the spread of poultry literature, and I hope the efforts of this *Journal*, our fellow-colonists are coming to the conclusion that poultry-keeping is a solid reality. Few people have any idea of the total value of the poultry owned in this colony. We export £50,000 of eggs annually, which is a considerable item of national wealth. Then the value, as articles of food, of eggs and poultry consumed in our province is very considerable. Many of my country friends are not kindly disposed towards what they call "show birds," that is birds of the highest degree of excellence. No more need be said on the subject than that breeders of stock of any description have proved the value of purity of blood and the value of type, and the retention of proven and ascertained qualities. Poultry-breeders have every promise of a successful season. We have our markets—let us exploit them. But let it be a record year as regards improvement in quality. Why is poultry a luxury? Because—(1) the quality is so poor that the buyer gets poor value, from a food point of view, for his purchase; (2) the trouble of preparing the ordinary under-grown fowl or duck is too much for the ordinary housewife; (3) owing to the expenses of modern dental surgery, the average man cannot afford to tempt Providence in the matter of eating tough poultry. I have more than once said that it is unwise to keep all the young stock to breed from and dispose of the old birds for table purposes. The oldest fowl may be made tender by the following procedure:—Fast the victim for twenty-four hours, then kill. To do this, drive the blade of an ordinary pocket-knife into the roof of the mouth, thereby severing an important blood vessel, and at the same time penetrating the brain—a painless and scientific method. After careful dressing and turning, place in a saucepan and simmer gently, never allowing boiling point to be reached until the bird feels tender when tested with a fork—about one hour for every year of age. When this point is reached, remove the bird and allow to drain; if boiled fowl is required, dress accordingly and finish off. If roast fowl is the point, stuff or

season, as in the case of a chicken; wrap round it some slices of fat ham or bacon, and brown as desired in a brisk oven.

I have now to discourse upon the virtues of another excellent breed of fowls—

### The Indian Game.

With the modern show game fowl the Indian Game has little in common. As regards its value as a prominent factor in the table poultry trade, too much cannot be written. I think it is fairly proven that the table fowl of the future is a cross-bred bird. Of late years, in England, much attention has been paid to this subject, and I need only quote such names as Sir Walter Gilbey, Bart., Messrs. Harrison Weir, W. B. Tegetmeier, and Brooke, the latter gentleman past-master of the London Poultry Guild—all in favor of the Indian Game, pure or crossed, especially with the Dorking. We have to remember that there are certain qualifications in a breed which tend towards profit, and consequent success. Of these I may cite as most important: hardiness of constitution, early maturity, and attractive appearance. Now, the last term is supposed to include, as it should in a table bird, quality of flesh as regards gastronomic virtues, fineness both of flesh and skin, and fineness and color of flesh and skin. I have already referred to the Dorking, the foundation-stone of table poultry. Some may quote certain French breeds as of excellent quality. At a recent poultry show (table birds) in England a very numerous contingent of foreign experts expressed their surprise at the excellence of the exhibits of English-grown poultry for quality and appearance. We can grow as good or better table poultry in South Australia than Continental Europe ever saw; but we must start in a proper manner. As regards Indian Game crosses, that with the Dorking heads the list for quality and appearance. For the English market the requirements are—quality always, then white skin and flesh, and, not so much as formerly, white legs—the three former always. Now, the Indian Game has bright yellow legs; the skin as a rule is pale-cream color, flesh excellent quality, and well placed; general contour as a table bird symmetrical and pleasing. Crossed with the Dorking we get a bird of the very highest quality in every respect, from the point of judging a table bird. As a rule these cross-breeds have the five toes of the Dorking; they have the Dorking characteristics, added to which we find the solidity of the Indian Game, and, in common with all cross-breeds such as I am now dealing with, the beneficial results of a fresh infusion of blood. Dorkings of super-quality are still scarce; the demand exceeds the supply, so we naturally look for a substitute, and we find the Langshan, the Orpington, and the Wyandotte. The Langshan is a bird of excellent table qualities in all respects, hardy and a good layer. The cross of Indian Game with Langshan results in a quick-growing bird of massive proportions and excellent qualities, hardly as quick to mature as the Indian Game-Dorking.

The Orpington is a composite bird of modern origin, but of excellent qualities. Crossed with the Indian Game little is left to be desired—a symmetrical bird of excellent quality.

As regards the Wyandotte, I have had few chances of personal inspection of crosses with the Indian Game, and for the moment I am indebted to my friends, Messrs. A. Hart, of the Government Freezing Works, Melbourne, and Geo. Bradshaw, Government Poultry Expert of New South Wales, for valuable information. They tell me that the Indian Game-Wyandotte is a perfect wonder as a table bird, slightly cream-colored in skin and flesh, but of ideal shape and gastronomic qualities. I believe this will be a leading cross. Space does not admit of further remarks at present; any question (accompanied by a stamped envelope) will be at once answered.

### The Indian Game Fowl.

The hens do not rank highly as layers; some are very good, others are poor. It is for their table qualities they are so valuable. Mr. G. T. Whitfield has the following remarks on this breed:—"In general appearance the Indian Game somewhat resemble the Malay, but are shorter in leg, rounder in form, and altogether more elegant, active, and vigorous, broad, flesh firm in handling, and very short and hard in feather, as if they were clothed in a coat of mail of burnished steel. The head is not as thick as the Malay, nor have they such a scowling look; eyebrows not so heavy or beetle-browed; pea combs, but cocks mostly dubbed; skulls broad; heads rather long, but not keen or snaky; faces rich red, smooth, and fine in texture—a striking contrast to their yellow legs and bright plumage when in high condition; beaks strong and well curved; necks medium length, slightly arched."

The following is the present standard of the Indian Game Club of England; certain modifications are now under consideration, and it may be necessary in a future paper to make a reference to such alterations.

*General Characteristics.*—Head and neck: General appearance of head rather long and thickish, not so keen as in English game nor as thick as in Malays, yet somewhat beetle-browed, but not nearly as much as in the Malay; skull, broadish; neck, medium length and slightly arched. *Beak:* Horn-color or yellow striped with horn, strong, well curved, stout where set on head, giving the bird a powerful appearance; whole face, smooth and fine in texture, including deaf ears; throat, not as bare as in English game, being dotted over with small feathers. *Comb* (in undubbed birds): Irregular pea-comb, the more regular, however, the better; small, closely set on to the head, deaf ears small and wattles very scanty. *Eye-brows:* Very slightly beetle-browed, but not giving such a cruel expression as in the Malay; eye, full and bold, of yellow color. *Neck:* Medium length and slightly arched; hackle, short, just covering base of neck; twisted hackle objectionable. *Body:* General shape; very thick and compact; very broad at shoulders, the shoulder butts showing prominently, but the bird must not be too low backed; body tapering towards tail; elegance is required with substance. *Back:* Plattish, but the bird must not be flat-sided, broadest at shoulders. *Breast:* Wide, fair depth and prominent, but well-rounded. *Wings:* Short and closely carried to body, well-rounded at point, and closely tucked at ends, carried rather high in front. *Legs:* Very strong and thick; thighs round and stout, but not as long as in the Malay; foot strong. *Shanks:* Medium length and well scaled; the length of shank must be sufficient to give the bird a gamey appearance, but in no case should it be as long as in the Malay, or in any way stilty. *Toes and nails:* Toes long, strong, and straight, and well apart, the back toe low down and nearly flat on the ground; nails well shaped. *Cock's tail:* Medium length with a few short narrow secondary sickles and tail coverts; carriage of tail drooping; tail to be close, hard, and glossy. *Hen's tail:* Rather short, carried low, but somewhat higher than cocks; well venetianed, but close. *Size and weight:* Large; weight in cock, 8lbs. to 10lbs., or more for adults; weight in hen, 5½lbs. to 8lbs. or more. *General appearance of both sexes:* Powerful and broad, very active, sprightly, and vigorous; flesh to be firm in handling; plumage, short, and cannot be too hard and close. *Carriage:* Upright, commanding, and courageous; the back sloping downwards towards the tail. *Color:* Of cock—breast, under body, and thighs a green, glossy black; neck-hackle, green, glossy black, with brown crimson shafts to feathers; back, saddle, and saddle-hackle a mixture of rich green, glossy black, and brown crimson, the former predominating greatly; wing-bow, chestnut, with metallic green, glossy black wing-bar; tail, green, glossy black. Of hen—ground color, chestnut-brown, with beautiful lacing of medium size; lacing of metallic green, glossy black; this should look as if it were embossed or raised. *Shank:* In both sexes yellow or orange, the deeper the color the better; face, deaf ears, wattles, and comb, a rich red. As regards lacing, double or triple lacing is most admired, and for the wing-bow of the cock, glossy black with dark crimson intermixed is now required.

**PURE SEEDS.**—It being quite possible that very great injury may be occasioned through the sowing of impure seeds, mixed with noxious weeds, it is most essential that every cultivator should be careful to deal only with reputable seedsmen, who should be responsible for the seeds supplied; and, additionally the purchaser himself should screen all seed before sowing.

## FRUIT FLIES.

During the past few months the danger of introducing the dreaded fruit fly from Queensland and New South Wales has been the cause of considerable trouble to the Department and apprehension amongst fruitgrowers. Although every precaution is being taken to prevent the introduction of this pest by careful examination of all fruit imported into the colony, there is always the danger that some infested fruit may escape notice, and so lead to the introduction of another enemy to the fruitgrower. The insect most to be feared is the so-called Queensland fruit fly (*Tephrites Tryoni*), but in West Australia there is a similar fruit fly (*Halterophora capitata*), which is very injurious to soft fruits. There is, however, at present little danger of introducing this insect, as West Australia sends no fruit to this colony. The maggots of the two flies are so nearly identical that none but the most competent observer would notice the difference; and in the illustration (kindly loaned by the New Zealand Department of Agriculture) is shown an apricot attacked by the West Australian fruit fly, and the fly, maggot, and pupa of the Queensland variety.

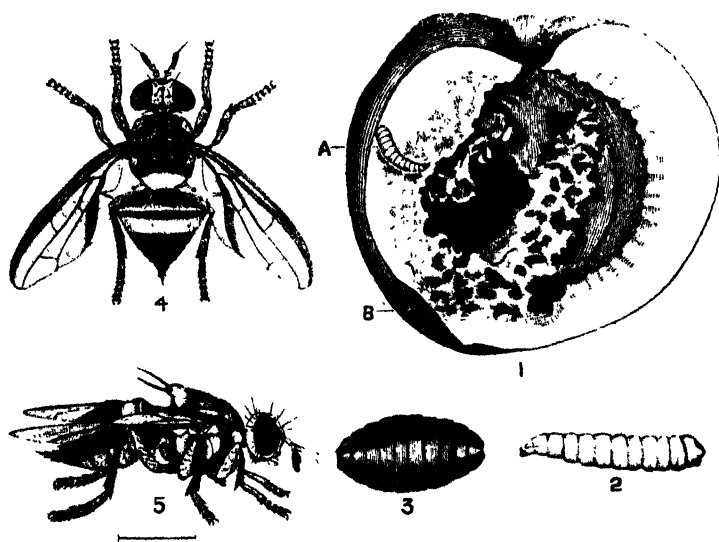


Fig. 1, infested apricot - A, maggot; B, holes where maggots have escaped from the fruit (after Claude Fuller). Fig. 2, maggot of *Tephrites Tryoni*, magnified. Fig. 3, pupa, magnified (after Froggatt). Figs. 4 and 5, back and side views of fly, magnified (after Kirk). The line below Fig. 5 shows natural length of fly.

There is no doubt that we have no insect in South Australia so destructive as the fruit fly, or so difficult to cope with, and it behoves our growers to keep a very careful watch for attacks by maggots of *any* description. The eggs of the fly are deposited in the fruit before it is ripe; hence it is impossible for any treatment to prevent the destruction of fruit once attacked. The maggots as they feed gnaw irregular passages towards the centre of the fruit, and cause the centre to become rotten. The fruit when first attacked shows very slight evidence of being infested, but as it ripens it shows darker spots where the skin has been pierced by the fly. The maggot is similar in general appearance to the ordinary meat maggot, and can be easily distinguished from codlin moth and other caterpillars by the general elongated form, the abruptly rounded posterior end, the two curious black hooks at the mouth, and the absence

of legs. The only way to check this pest is to destroy all infested fruit, and trap the maggots should they leave the fruit before it falls. Lime, gas lime, or other caustic top-dressing on the soil under the trees would in all probability destroy any maggots that drop to the ground.

Growers finding their fruit attacked by anything in the shape of a maggot should at once forward specimens to the Agricultural Bureau, Adelaide, for identification and advice as to treatment.

## APPLE BITTER-PIT.

In the New South Wales *Agricultural Gazette* for May a correspondent writes that he has used Bordeaux mixture for prevention of this disease. He states that whereas in previous years, after the apples were stored, the disease spread until nearly all the fruit was affected, since he adopted spraying he has had very few apples affected. One tree which was missed produced fruit which became almost unsalable from the effect of this disease. He sprays his trees with Bordeaux mixture with Paris green when he is spraying for codlin moth—about November—and then three or four weeks later, and is of opinion if the latest varieties were sprayed in January the disease could be completely stamped out.

In South Australia the loss, amongst stored apples especially, from this obscure disease has been very serious, even amongst trees sprayed with Bordeaux mixture for the prevention of apple-scab. As, however, this spraying is now generally given before the buds have burst, it would be well for those orchardists who have suffered from the disease in the past to treat their trees in November and December with summer strength Bordeaux mixture.

## ORCHARD NOTES FOR JULY.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

This is a busy month for the orchardist. Those orchards that have not yet received the winter's ploughing should be broken up at once if a proper soaking is to be given to the subsoil.

The planting of deciduous trees should soon be finished in the open country, but in the cooler districts there is yet plenty of time. Intending planters in these localities are often faced with the difficulty that the nurseries are nearly all located on the plains or earlier positions, and if these planters in late localities leave the procuring of their young stock until the soil is ready in their respective districts the best stock is often sold out of the nurseries. Although I do not think it is advisable to plant the trees during the wettest month in districts with a heavy rainfall, they may be procured from the nurseries and heeled in, after pruning away broken roots, in warm sheltered corners. Root action may begin, but if care is taken the trees may be safely transplanted into their permanent positions as the weather grows milder without injury to new rootlets.

The pruning of deciduous trees is now well under way. I take it that plums and apricots are completed; cherries, after being well formed, require very little pruning indeed. Peaches, apples, pears, and quinces should be pruned during this month. In pruning different varieties of the peach one peculiarity has to be kept very closely under observation, viz., the positions in

which the flower buds are placed upon last year's growth. The late and midseason sorts carry fruit buds almost to the base of the spurs; consequently these may be pruned back sharply to a few buds, but the early sorts nearly all set fruit buds on the terminal points of the lateral growths, thus rendering the treatment of these directly opposite to that applied to the first-named sorts. Another consideration affecting the early varieties is their tendency to cast off great numbers of fruit buds in the late winter. The evil effects of this characteristic can be largely counteracted by late pruning—that is after the buds are shed. The pruning of the apple and pear is of a very similar character. On young trees the main tips are cut to direct or maintain the future shape of the tree, and the laterals are shortened in to hasten the formation of fruiting spurs. This shortening is best carried to the extent of cutting over the base bud, and afterwards summer breaking the resulting shoot if rendered necessary by too rampant a growth. Old apple and pear trees already in full bearing will not require this treatment. Quinces should not be severely pruned, merely thinned out. Hard pruning only causes a multiplication of barren water shoots or suckers.

If the orchardist desires to graft over certain trees now unsuited to his purposes the fine ripe top growths should now be secured from the varieties which he considers desirable. These scions should be tied in small bundles. It is not necessary to trim them in any way. They should be carefully labelled, and then buried in sand in a sheltered spot where the sand will be always moist, *but not saturated* with water. In this position they will keep in perfect condition until the time of grafting, viz., early spring, arrives.

The limbs of any trees that have been budded late in the summer should now be cut back immediately above the dormant buds. Young trees that are planted out into the orchards as dormant “buds” should be closely root pruned.

Although somewhat late in the season the “pits” of apricot, peach, and Myrobalan plum can yet be set out for raising stocks.

It is a very good time to procure from a few ripe passion fruits enough seeds to raise a batch of seedlings. These plants are easily raised from the seeds of imported fruits, and bear fruit within eighteen months of sowing the seeds when grown upon a northern wall or fence in most localities around Adelaide.

The harvesting of oranges is now in full swing, but unfortunately the crop is light. While examining many cases of oranges, both of the sweet and mandarin varieties, imported from Sydney I have been particularly struck with the high percentages of rotten fruits where they have been pulled instead of cut from the trees. The Mildura growers cut all their exported fruits, with much better results. The Italian lemons which arrive in such splendid condition are also all cut from the trees, the short twig stump being cut so closely and evenly that it never pierced or bruised the adjoining tightly packed fruits.

The scraping of tree stems to destroy codling moth larvæ should be done whilst the bark is soft and wet, and the reduction of the height of the trees be considered in connection with this pest. As this promises to be a wet season fungus diseases will no doubt be troublesome, and I would particularly warn growers who have been lulled into false security by the immunity experienced during the last two dry repressive seasons not to think that the diseases have been eradicated. In most localities I am of the opinion that August is the month during which Bordeaux mixture can be used for apricot shot hole; peach curl blister, apple and pear scab diseases with the greatest effect, and will take the opportunity of dealing with the matter more fully in the issue of next month.



## THE VINEYARD.

### NOTES AND HINTS FOR JULY.

*Written for the "Journal of Agriculture and Industry."*

BY ARTHUR J PERKINS, GOVERNMENT VITICULTURIST.

Pruning should be completed during the course of this month, excepting in those localities where a late budding is particularly required. If, for instance, late frosts are of frequent occurrence, it may often prove advisable to defer pruning until August.

The first ploughing should be brought to an end in July, and the second ploughing, on a comparatively shallow furrow, might even in some instances be started. In most cases, however, August will prove quite early enough for this operation.

Planting out of rooted vines should be pushed on with vigor in July. It should be remembered that, except in cold wet districts, early planting is usually a commendable practice. In light, well-drained soils towards the end of the month even cuttings might be put out, either in the vineyard or the nursery; usually, however, August will prove more favorable for this purpose. In any case, cuttings should be collected and kept buried in sand until required for planting or for scions for grafting.

## NOTES ON VEGETABLE-GROWING FOR JULY.

BY GEORGE QUINN.

On the plains and drier parts of the colony, not much subject to severe frosts, the planting of potatoes will be resumed this month. Practical growers at each planting make a change of tubers—so-called seed—procuring, if possible, those grown in quite a different locality. The tubers in this planting should be set quite 6 in. deep in the soil, as the growth of the plants and the expansion of the tubers will mainly take place when the ground is drying out near the surface. Good plump sets should be used, and the eyes should be started, but not sufficiently to be broken during the planting operations. When the sets are put into the trench a good sprinkling of well-ground bonedust should be spread along on top of them. This is done because the roots develop and feed on the soil above the tuber as a rule. The sets are said to grow better if pressed firmly into the soil.

The transplanting of cabbage, onion, cauliflower, lettuce, kohlrabi, herbs of various kinds, red and silver beets, should be continued. If rain is not falling at the time in soaking showers these plants should be watered individually.

Fresh sowings in drills of carrot, parsnip, onion, swede turnip, ordinary turnip, red and silver beets, and broad beans should be made.

Peas should also be sown in the usual manner. This is a good time to sow the main crop.

Make the usual small sowings of cress, lettuce, and radish for salad purposes. Spinach may be sown yet, and former lots should be kept picked down as the leaves develop to the size of the palm of a human hand. This prevents the plants running to seed quickly.

Asparagus and rhubarb beds may be made. [In last month's notes a short account of how to form the beds and set out the plants was given. In report of meeting of Norton's Summit Bureau in this issue an instructive paper on rhubarb cultivation appears, and is well worthy of study by those growing rhubarb for commercial purposes.]

A start should be made towards the end of the month to raise an early batch of tomatoes, cucumbers, and other plants of the melon family. These are raised and nursed in artificial heat generated by the slow combustion of manure, and the process is simple, but at the same time great care is required while the weather is cold. A plain box frame, facing north or north-east with a good slope in that direction, is set upon a couple of loads of fresh stable manure, and then the manure is piled around, say, to within 6in. of the top of the frame. The frame is filled with a good compost if the seeds are to be sown in it; if not, the small 4in. pots should be filled with good soil after being securely drained. These are plunged to their rims in the soil, and should rest on the manure. When the seeds are sown a stretched calico or glass light should be placed over the frame. When the surrounding manure cools, remove it and replace with a fresh lot. The manure, both around and beneath the frame, should be firmly stamped down.

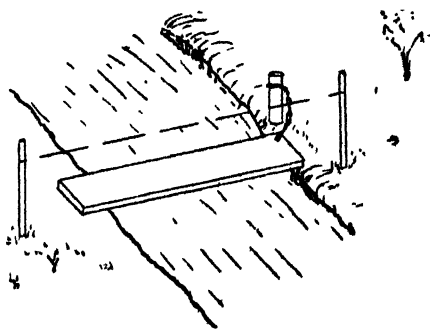
All watering should be done on warm sunny mornings. If given at night time the young plants will almost assuredly damp off.

Attention should be given to insect pests, and every effort made to check them in the initial stages. I shall be happy to publish any known remedies for pests submitted by any of our readers.

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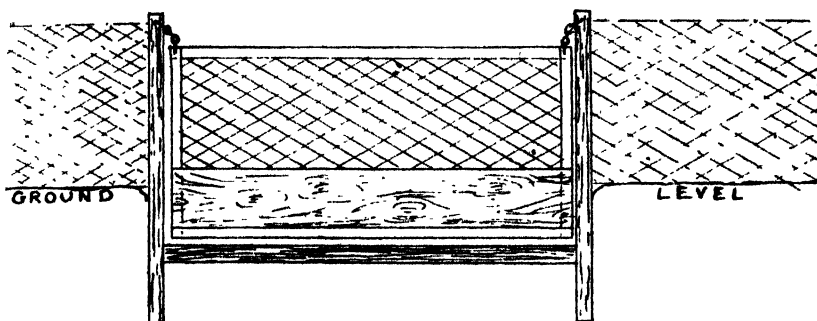
## SOME HELPS FOR THE FARMER.

Where a farmer or gardener is fortunate in having a running rivulet on his holding he is liable to have his footbridge washed away when a freshet or flood occurs, turning his rivulet into a torrent. A simple plank laid across from bank to bank, with a short log sunk into the soil on each side for the ends of the plank to rest upon, will give a ready means of access from one side to the other.



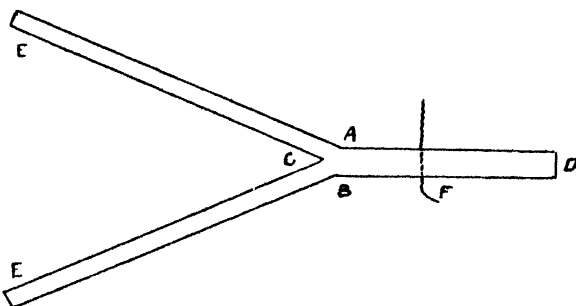
But some people can never cross on a plank or log without a handrail; therefore it is desirable to put in a post on either bank of the creek, and affix a length of fencing wire to the top of the posts. To avoid loss of the plank when the floods come down, it should be attached by a chain to a short post sunk deeply into the soil.

Another trouble where creeks run through farms or gardens is the washing away of the fences which cross them, and many have been the contrivances to avert this disaster. The swing gate here illustrated will be useful in some cases.



This is designed to prevent ingress of rabbits, hares, dogs, and other vermin. The banks of the creek should be built up to the posts, which should be extra long and sunk deeply into the soil. Between the posts a heavy sill of jarrah or other hard wood should be fixed. The gate should be rather heavy at the bottom, boarded so as to give the water an opportunity to lift it somewhat. The whole gate should swing by short links at the top ends, and the top rail should be strong. A short post sunk about the middle of the channel, close to the gate on the inner or up-stream side, would prevent animals gaining entrance from outside the property on the lower part.

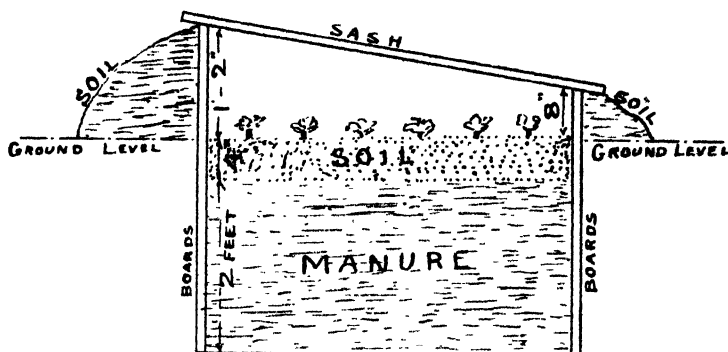
For an exceedingly simple fence wire strainer Mr. J. W. Taylor, of the Kadina Branch Agricultural Bureau, submits the following design.



It is made from mallee wood. From A to B  $2\frac{1}{2}$  in. to 3 in. thick, from C to D 8 in. or 9 in. long, from C to E & F 24 in. to 30 in. A hole is bored through at F, through which the end of the wire is placed. The portion from C to D rests against the post, and by aid of the two forks the implement is twisted so that the wire is wound upon the thicker part. If a greater leverage is wanted a stick may be placed at the intersection of the forks at C.

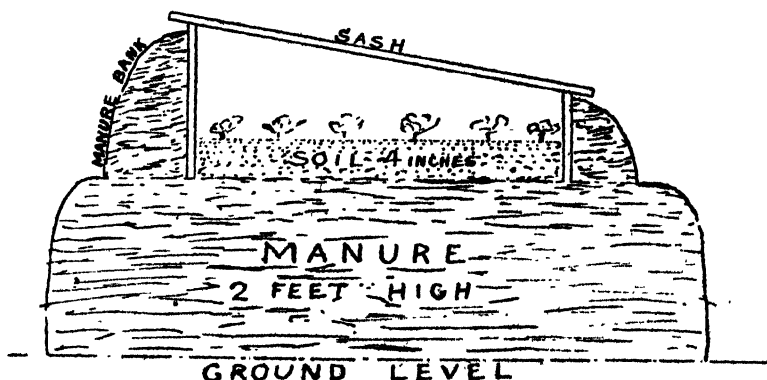
In order to raise early plants for setting out when danger of night frosts is over, the farmer and gardener require to protect them. In some cases ordinary cool frames will do; but other plants require some degree of heat. This can be easily obtained by the use of stable manure or other fermenting

material. Whether cool or heated frames are needed, their construction may be alike; but a cool frame may be needed during summer, and in that case the following form could be utilised without the manure if the pit were filled to within 4in. of the surface. This would be a permanent structure; and, in place of boards, the walls might be of brick.



The manure should be trodden down firmly, and left to ferment until the temperature is reduced to 100deg. F. Then put on 4in. of light rich soil and sow the seeds in it; or fill flower-pots with good soil, sow the seeds in this, and plunge the pots to the rim in the soil. Watch the temperature, which may rise above 100deg. F., in which case lift the lower edge of the sash a little to reduce the heat to the proper point. The sashes should be glazed, as a general rule; but, in the absence of glass, calico waterproofed with boiled linseed oil and dried may be used. The hotbed may be of any length, but 6ft. is most convenient. The width should be 5ft. to 6ft.

Where there is abundance of farmyard manure a portable frame 6ft. x 5ft. may be used. The front or lower side should be 8in. to 10in. high; and the back 16in. to 18in. high, with ends to fit. The manure heap should be about 2ft. high and at least 1ft. wider than the frame all round. Place the frame on top of this, fill in 4in. good soil when the temperature is down to 95deg or 100deg. F., heap manure around the outside of the frame, and sow or plunge pots as above.



Tobacco plants can be raised in a cold frame if seed is sown during July, or they can be forced by sowing in a heated frame during August. Tender

vegetables can be raised in long rows, ready to plant out directly night frosts are over, by using two 9in. boards fixed together at the ends in a V-shaped trough. When the plants are large enough, and frosts are over, take the troughs of plants to the beds, dig out a shallow V-shaped trench, place the rows of plants in the trenches, knock out the end pieces and lift away the boards. Then pack in soil on both sides, and the plants will grow on and produce extra early crops.

## FARM NOTES.

*Written for the "Journal of Agriculture and Industry."*

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,  
ROSEWORTHY, SOUTH AUSTRALIA.

The season continues favorable; crops have had an excellent start, and are growing apace in appreciation of the soft fresh weather.

On the College farm we have just finished the seeding of peas. The field on which they have been sown carried wheat last year, and it was intended to have cropped it again with wheat in view of the encouraging forecasts of wheat values next harvest. Neither alternative is exactly within the law of cropping best suited for our conditions, but contingencies might justify either. Wheat is much more reliable than peas in this district, and on the average pays decidedly better; but owing to the welcome succession of rains we found it impracticable to have the field cleaned and seeded until very late for cereal sowing, and accordingly we fell back on peas. The land was cultivated after the first rains, and part of it was cultivated a second time early in May. During the past few days part of it has been lightly ploughed, and the remainder scarified to kill such vegetation as had germinated in it. It was then thoroughly harrowed, and drilled with approximately 2bush. of Early Dun peas and 150lbs. of bone superphosphate per acre. The manuring is light, as the field is in very fair heart. For the coming month we shall continue our fallowing operations, and devote to it the burden of our horsepower. It is very important to have the fallowing well forward, for year after year we have evidence not to be gainsaid that early fallowing gives the best results. Some farmers persistently delay fallowing work until late in the year, but every year sees their numbers diminishing. It used to be argued that early fallowing allowed the weeds on the ploughed land to get too far ahead to be easily killed in the early summer. That the weeds do get farther ahead, and a greater number of seeds germinate in the spring is, of course, a fact, but one of the reasons for fallowing is just to secure such germination in order that the field may be cleaned. The little extra labor required to kill them, to wit, a second ploughing *vice* scarifying is all in favor of the land. Then again, I have heard it advanced as a waste of good feed to fallow early, but the gain is greater than the loss. One shilling or one and sixpence per acre is the full value of the winter grazing—if the farm be clean the value is much less—and bushels per acre measure the advantage of having the land lifted in time to swallow the winter rains, and of having it exposed to winter weather. The chief end of fallowing, I reckon, is to secure increased moisture in the soil and subsoil for the succeeding crops, and the amount so secured is proportional to the time it has been lying open to the weather, and the care with which it is handled during the summer months. Takeall and other troubles also tend to beset the man who by fallowing late fails to secure that mellowness and consolidation on his seedbed essential to a first-class crop of wheat. Other work which we will have in hand during the month is the carting and spreading of the year's

accumulation of farmyard manure on land to be planted with kale, and the deep ploughing and preparation of that land for the planting. The seed has been sown in beds to be planted out when ready. This practice we think better than sowing *in situ*, as we can prepare the land with more deliberation than if we had had to crush the work into the seeding weeks proper, and we get time to clean the land fairly before planting. Further, transplanting requires less seed, and the plants can be dibbled out so as to be in rows two ways, and expedite the horsehoeing and cleaning; and if the labor of thinning and extra handhoeing necessary after drilling *in situ* be carefully estimated, it will be found that the one method costs very little more, if any more, than the other.

This year pigs have been an exceedingly good line on the farm. Brood sows, from which the litters were sold when ready for weaning, have been returning from £6 to £9 for their keep. As the growing of peas and the feeding and breeding of pigs go well together I think it worth while to write now at some length on the pea crop. For some time also peas have sold very well, no doubt, because so few farmers care to grow the crop. Good seed peas now cannot be had readily for less than 4s. 6d. or 4s. 9d. per bush. One cannot forecast next year's prices, as a relatively small area of this crop meets the local demand, but there is now considerable encouragement to devote some attention to the crop. Should the market experience a slump before the grain can be sold the alternative of feeding the grain on the farm remains. Indeed under any circumstances there is much to recommend us to feed all peas grown in the yards on the farm. It is a practice which helps very appreciably to maintain the fertility of the land. To feed part peas to draught horses lessens the bran bill; no money at any rate goes out for this, and draught horses do well when a part of their dietary consists of a foodstuff so highly nitrogenous as peas. Dairy cattle respond well also when peas are added to their rations, and for pigs everyone knows it to be a foodstuff well suited, and likely to give that firmness of flesh and condition which the curer so much appreciates. I do not forget that peas as a foodstuff for dairy cattle is discounted by some authorities, but others, and I think the majority, find no fault with it, but rather much to recommend it. The farmyard manure from stock fed partly with peas has a high value relatively. Again, it has been common experience for centuries that wheat likes to follow such crops as peas, beans, and clover. The explanation offered some years ago of this experience is found in the symbiosis or association of microbic life with the roots of these plants. The numerous colonies of microbes forming the tubercles found in the roots of the pea render the nitrogen of the air available to the plant, and the result is that the pea crop does not impoverish the soil of nitrogen—the most expensive manurial element. The pea crop, owing to this influence, is described by some agricultural writers as a nitrogen collector, while a cereal such as wheat is a nitrogen consumer. To grow peas, and more especially to feed them on the farm, is therefore a direct means of maintaining fertility on the farm, and as things are there seem good reasons for suggesting that more attention be given to the crop. Its position has been gradually becoming less important among farm crops for at least two generations, but it has lost place not because it is so much less remunerative than cereals or roots, but rather on account of the hard labor required in harvesting it. The mowers and binders in the course of their improvement have every year been rendering the harvesting of cereals a simpler matter, but a machine thoroughly efficient for the harvesting of peas has not yet been brought forward, or at least brought under general notice. I would enumerate the objections to peas as follows:—

1. No expeditious mode of harvesting.
2. That it is a risky crop: (a) rugged bleak weather when the crop is in bloom may diminish the yield by one-third or even one-half: (b) fungoid diseases, though in this colony this risk is less

for peas than for wheat: (c) liability to serious injury from insect pests *e.g.*, caterpillars. 3. That it encourages the growth of weeds, and from its trailing habit is difficult to clean. The varieties chiefly grown in the colony are Early Dun and the Partridge pea—the former for the plains, and the latter for the hills and the moister districts. Other good varieties which can be had are the White Canadian and the Blue pea.

It would avail little to try peas, I fear, on the drier of the farmed lands in the colony. On the College farm, with an average rainfall of 16in. to 17in., the pea crop, as I have said, is invariably less successful than wheat. It is in the moister districts that peas should be grown, if grown at all, prominently. On dairy farms especially should this crop have a place.

It likes a free soil, calcareous more especially. Our mallee lands would grow peas well were the rainfall better.

In the preparation of the land the cultivation need not be so deep or so thorough as for a root crop. Light ploughing and very thorough harrowing suit it well. The tilth must be fine. Too heavy manuring or a rich soil tends to too much haulm, and from 1½cwt. to 2cwt. of a good phosphatic manure will generally be found sufficient.

The after cultivation consists in harrowing when the crop has braided, and again later when say 4in. above ground, and rolling heavily. If well drilled it is often desirable to horsehoe the crop with the view of keeping down weeds, which thrive so luxuriantly among peas.

The harvesting of the crop is a difficult matter. One method, a very useful one where the crop is grown for pigs, is to harvest with a horsrake or pearake before the crop is so ripe as to shell out readily, but sufficiently ripe for the straw to break off readily at the base. So harvested the crop can be stacked near the pigyards and fed in the yards unthrashed. The loss in the field can be largely recovered by allowing pigs to run over it for a sufficiently long time, but by feeding unthrashed the straw, of course, is largely lost. Raked up in this way peas cannot be put through the thrasher without risk from the sticks, straws, &c., accidentally gathered by the rake, though it is often done. The best method is still that of our fathers, *viz.*, to harvest with the sickle, but it is very expensive, and only, I think, to be practised when a seed sample of grain is desired and the pea straw is required for forage.

## WHEAT PRODUCTION IN SOUTH AUSTRALIA.

BY R. W. FOSTER, M.P.

A review of the history of agricultural settlement and wheat production in South Australia for a period of twenty years would, under any circumstances, be interesting, but is especially so in view of the recent glorious rains which promise, according to the law of averages, to usher in a cycle of good seasons, to the delight of our deserving and courageous tillers of the soil. I have therefore submitted the average of each five years, from which it will be seen that the South Australian farmer is liable to severe fluctuations of fortune, especially in the Upper North; and I propose dealing more particularly with that portion of the country, which has been the cause of so much anxiety, not only to the settlers themselves, but to the whole colony, during the past three years.

The period under review covers what is known as the Playford resumption policy, about which so much adverse criticism has been expressed; and at this moment there are not a few who insist that the plough should never have crossed beyond Goyder's celebrated rainfall line. It would appear as if the recent drought had accentuated this contention, but a glance at the return

presented herewith will suffice to show that the Upper North, which comprises hundreds outside the rainfall line, is responsible for nearly one-fourth of the wheat returns of the colony during the years 1876 to 1880, while during the following fifteen years the Upper North portion has yielded considerably more than a third of the total production. The area under cultivation in the Upper North as against all the rest of the province has been one-fourth from 1876 to 1880, more than one-third from 1881 to 1885, 123,896 acres less than one-half from 1886 to 1890, and only 59,282 acres less than a half from 1891 to 1895. These figures indicate a considerable extension in the Northern district, and speak eloquently of the energy and enterprise of the farmers in that precarious locality. With them not only has the area cultivated steadily increased, but the character of cultivation has been wonderfully improved. Wool-growing has been introduced as a most efficient method of improving the land, as well as giving the farmer another string to his bow; but the most pleasing feature of northern agricultural settlement is found in the fact that during eight years out of twenty the Upper North has topped the average of the colony considerably, and in other years it has come very close up to that distinction. Here are a few examples.

	COLONY. Average in Bushels.	UPPER NORTH. Average in Bushels.		COLONY. Average in Bushels.	UPPER NORTH. Average in Bushels.
1877.....	7.76	10.71	1890.....	5.62	6.35
1878.....	7.30	8.24	1891.....	4.15	5.60
1884.....	7.53	8.12	1892.....	6.08	6.71
1889.....	7.91	11.20	1894.....	4.90	6.00

I have omitted the returns for 1896 and 1897, because, in my opinion, the drought was phenomenal, and the inclusion would not institute a fair comparison. The averages for these years were:—1896—Colony, 1.66; and the Upper North, 0.58. In 1897—Colony, 2.64; and Upper North, 1.28. It is only fair to submit comparisons of a few of the worst years, and I quote eight of the lowest averages within the twenty years.

	COLONY. Average in Bushels.	UPPER NORTH. Average in Bushels.		COLONY. Average in Bushels.	UPPER NORTH. Average in Bushels.
1880.....	4.96	3.83	1888.....	3.85	3.00
1881.....	4.57	3.00	1891.....	4.15	5.60
1882.....	3.68	3.00	1894.....	4.90	6.00
1885.....	3.16	3.00	1895.....	4.20	4.00

During the eight lowest years the Upper North leads in two, and the average for the eight is 3.93 against 4.18 for the colony. The comparisons clearly indicate as to production that good and bad seasons come in cycles, and what has been may be expected again; and further, that droughts relatively affect the entire colony, and not the North alone. It is cheering to note that the expectations of farmers, which have been raised so high during the present month, find ample justification in the returns of 1889 and following years, after a severe season of drought, with an average of 3.16 for the colony and 3.00 for the Upper North. The 1889 harvest turned out 7.91 for the colony and 11.20 for the Upper North, followed by five good years, during which the average beyond Goyder's line was only once under 6bush., viz., in 1891, which gave a little over 5½bush.

A Customs return of the value of agricultural implements and manures shows how completely the rule-of-thumb business is giving way to more effective methods.

	IMPORTS.			
	1896.	1896.	1897.	1898.
	£	£	£	£
Implements—				
Mostly drills .....	4,259	4,954	14,633	—
Mowers and binders .....	6,070	8,117	12,519	—
Manures .....	643	2,720	16,759	23,564



In addition to imported manures up to the 21st instant there are local companies whose output, I am informed, in some instances has increased 30 per cent. during the present year. One point which cannot be emphasised too strongly is the urgent need for a proper inspection of fertilisers as a guarantee that farmers are protected against fraud, and the Agricultural Department would do well to give every encouragement to the Roseworthy College as well as to the branches of the Agricultural Bureau, whose work in different parts of the colony has borne good fruit, but whose promise of future usefulness is brighter than ever before.


**SOUTH AUSTRALIAN WHEAT PRODUCTION.**  
**TWENTY YEARS—1876-1895.**

Average of Five Years.	Division.	Acres (mean).	Bushels (mean).	Mean Average Yield. (B.)	Mean Annual Rainfall. (In.)
1876 to 1880	Central .....	536,905	3,673,641	6·84	19·23
	Lower North .....	497,359	3,576,517	7·19	16·57
	Upper North .....	269,480	1,808,791	7·01	12·57
	South-East .....	34,419	291,192	8·47	23·04
	Western .....	10,810	68,216	6·31	15·43
	Province .....	1,348,973	9,418,357	6·98	20·67*
1881 to 1885	Central .....	582,664	3,297,105	5·56	18·58
	Lower North .....	599,404	3,471,466	5·78	13·88
	Upper North .....	588,242	2,790,318	4·75	11·00
	South-East .....	37,416	269,816	7·21	21·90
	Western .....	29,500	146,322	5·00	15·06
	Province .....	1,837,226	9,975,027	5·43	18·95*
1886 to 1890	Central .....	549,404	3,803,657	7·00	20·91
	Lower North .....	634,297	4,211,755	6·64	17·76
	Upper North .....	561,470	3,455,008	6·15	13·72
	South-East .....	29,879	249,146	8·36	23·94
	Western .....	33,256	282,584	8·50	17·44
	Province .....	1,808,307	12,002,150	6·64	22·31*
1891 to 1895	Central .....	416,566	2,255,184	5·41	18·87
	Lower North .....	556,256	2,926,921	5·17	16·25
	Upper North .....	499,814	2,897,203	5·80	12·33
	South-East .....	29,375	243,681	8·29	22·60
	Western .....	56,713	278,047	4·90	15·13
	Province .....	1,558,724	8,601,036	5·52	20·22*

\* Mean rainfall at Adelaide Observatory.

## PHOSPHORISED WHEAT FOR BIRDS.

By F. H. L. HOLZGREFE, MILLICENT BRANCH AGRICULTURAL BUREAU.

I use a 20-gall. cask with a 5in. square hole cut in one head. This piece is cut on the slope, thus , with a narrow-pointed saw, and the face of the cut is lined with leather, so that the piece will fit in to exclude all air. To ensure perfect exclusion of air I also use a staple and screw, such as is affixed to some barrel churns. Put 60lbs. of wheat into the cask, with a large cupful of salt, and pour in enough boiling water to cover the grain. Close up, and allow fifteen minutes for absorption of water. Then open the cask, tack a

piece of perforated zinc over the hole to prevent the wheat escaping, and up-end the cask to allow excess water to drain away. Whilst the wheat is steeping dissolve six sticks ( $\frac{3}{4}$ lb.) of phosphorus—one stick for each 10lbs. of wheat—in one quart of boiling water. Keep this close to the fire and stir it well, but do not let it boil. When completely dissolved pour solution into the cask, close up quickly, and roll the cask backward and forward for ten minutes. Then stand it on end, in a cool place, with a wet bag over it for two days, by which time the grain will be ready for use. It is best after the expiry of a week, and is most effective when laid out in dull, cloudy weather. If the cask is kept airtight the mixture will keep good for a year. For smaller quantities use one stick of phosphorus for 10lbs. of wheat. It mixes best when the cask is half full. I find wheat prepared in this way very successful in destroying sparrows.

## HOUSEHOLD HINTS.

**TOILET SOAPS.**—For these superior fats are used, such as lard, cocoanut oil, olive oil, &c. The soap is made with lye, &c., like any other kinds. To prevent them sticking to the moulds they are lined with thin calico, taking care there are no folds. These soaps are colored in various ways, and scented with divers perfumes, either pure or mixed, the colors and perfumes mixed with alcohol or glycerine, and then well stirred into the paste. Transparent soaps are made by slicing well-dried suet soaps and dissolving in alcohol. Oil soaps are rather difficult to treat in this way. Mottled soaps are colored by stirring in solutions of sulphate of iron and of cochineal separately, when the paste is setting. Scrubbing soaps have a mixture of silicate of soda, or very fine sand in some cases. Colorings used are vermilion, chrome red, fuchsine caramel (burned sugar), umber, chrome green, smalts, ultramarine, palm butter, lampblack. For fine toilet soaps—*Red*, tincture of dragon's blood, carmine; *rose*, tinc. carthamine or of archil; *yellow* and *orange*, tinc. annatto or saffron; *blue* and *violet*, tinc. of litmus, or alkanet root, or soluble Prussian blue, or pure indigo pulverised; *green*, a mixture of blue and yellow.

**ABERNETHY BISCUITS.**—One quart milk, six eggs whipped, 8ozs. loaf sugar,  $\frac{1}{2}$ oz. caraway seeds, enough flour to make a very stiff paste. Roll out thin, and bake in an oven not very hot. These are quite easily digested.

**ARROWROOT.**—Take the roots of *Canna edulis* (for pink arrowroot or tousles-mois), or of *Maranta edulis*, or other tuberous roots generally used for this purpose, when the foliage has dried naturally, and wash them clean. Then grate and pulp them, and mix with plenty water; stir thoroughly until all the starchy matter is dissolved in the water; strain out all the refuse, let the thick milky water settle, and then draw it off quite clear. The sediment can then be dried, and when pulverised is fit for use as arrowroot.

**SHEEPSKIN RUGS.**—If the skins are dry soak them in water till quite soft. Scrape off all fat and flesh. Wash well in warm water with plenty soap; wring out, but do not rinse. Then place them in a mixture of 3 $\frac{1}{2}$ lbs. salt in 5galls. soft water, stir well; then add 20ozs. commercial sulphuric acid. Leave the skins in this two days. Rinse in cold water, and wring out dry. Hang up in the shade to dry, and comb the wool out whilst drying; also rub the skin often, and stretch it every way. Scrape the skin side with a blunt knife, and rub with pumice-stone, dusting with whiting.

**BEE STINGS.**—Some people are seriously affected by the sting of a bee; but a sure preventive of such effects consists in immediate application of spirits of ammonia. A bottle of spirits of ammonia should be kept ready by every bee-keeper, in case of some person being stung who is possessed of a weak heart, and who might even be killed by a single sting.

## TREATMENT OF MILK AND CREAM.

By G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

*Composition of Milk.*—An average composition may be quoted as follows:—

	Water .....	87.5
	Fat.....	3.5
Germ Food {	Casein .....	3.5
	Sugar.....	4.5
	Albumin .....	.25
	Ash .....	.75
		<hr/> 100.00 <hr/>

Fat is the most important constituent in milk, and which we so strongly desire to be of a high percentage. The other solids will rise relatively with the fat. The question may be asked, how are we to get this increased quality? There is no other direct answer than this: Breed from a good strain of cattle, *i.e.*, from cows possessing an inherited property of producing milk with a high percentage of fat. Get this individuality fixed into the herd, cull out the mongrels bit by bit, those unsymmetrical ghastly formed animals, with vessels shapeless, displaced, and contracted, neither good for milking nor beef-production. Study the milking pedigree of your dams; bear in mind that the sire can impart to his progeny his inferior qualities with greater certainty than his good qualities. We have one breed of bulls possessing the remarkable certainty of impressing their good qualities on their progeny, even out of inferior breeds with which they have been mated, the progeny of the coarse dams being more symmetrical; of the small dams, larger; and of slow feeders, quicker than their respective dams.

Dealing now with casein and sugar classed in the composition of milk as germ food, sugar is the most soluble and immediately available food for bacteria, the substance which these living bodies convert into acid, producing in turn the familiar souring of milk. How often in the summer mornings has the factory manager to contend with this almost worthless milk? Souring occurs so often that it is almost impossible for butter made from such milk to reach Adelaide, far less England, as a wholesome article of food. The question is daily raised, how are we to check this souring of our milk and cream under such severe climatic conditions as we experience in South Australia, and, without a knowledge of chemistry and bacteriology, the severity of climate is tenaciously clung to as the true and only cause of failure of dairy produce. But the main reason for such a state of affairs is want of cleanliness, want of care and knowledge in handling milk and produce, and want of energy on the part of those interested and connected with the dairy industry. If one is most energetic in his or her work, cleanliness will naturally receive due attention, and further knowledge and perfection be desired.

*Uncleanliness.*—With unclean milkers, sour-making and highly injurious germs will be clinging to the dirt upon their hands and clothes in millions, and will find their way into the milkpail, there to carry on their disastrous work. These germs are to be found in the air in the rooms of houses in incalculable numbers, in the air outside, upon the udder, and in the teats of cows, so numerous that figures cannot possibly represent their numbers. In the drawing-rooms of mansions, even where the rooms are frequented only a few times a year, do we find bacteria. The housewife will boast of her cleanliness, no dust is here perceptible to the eye. But when the sun shines through the air of her room, after only the slightest commotion has been caused, dust will be visible. Were we the possessors of eyes as powerful as microscopes, millions

upon millions of germs or bacteria, or microscopic plants, or ferments would present themselves to our view. What must it be, then, where the matter of cleanliness is unattended to? Milk is the happy hunting ground for most forms of bacteria, and when exposed to uncleanly conditions cannot possibly keep sweet but for the shortest time, even in a cold climate, far less in a warm climate like ours. Not only is milk the happy home of the microbe, but when at a lower temperature than the surrounding air it is a powerful absorbent of odors.

*Drains.*—Around and probably in some factories and creameries milk and dairy refuse is allowed to putrify, the abominable smells finding their way into the produce, with the result that it is impossible to find a profitable market for the produce. It is not an uncommon thing for one to go into a butter sale-room and find samples of butter possessing the distinct flavor of the smell of drains. These drains, instead of draining away the poison of the factory or creamery, are draining away the money of the proprietors.

*Remedies.*—First, milkers must be thoroughly cleanly in person and habits, the hands free from every particle of dirt, udder of cows perfectly clean, and utensils sterilised. This is within the reach of all. When milking, the first few drops of milk from each teat ought to be collected in a measure and given to the pigs. If allowed to pass into the milk pail it just means that you will have the whole body of milk inoculated with a fluid seething with acid, making bacteria and other forms of a most harmful character. Before the pail finds its way to the milkhouse the germs causing sourness will have begun their work. It is not perceptible to the taste, still it is there.

*Cooling.*—When milking is finished, milk ought to be immediately cooled down by passing it over a Lawrence cooler or refrigerator, in order that the animal heat and odor may be driven off, and also to retard the multiplication of bacterial life. You may say, why is the multiplication of bacterial life retarded? In the summer we find that the souring of milk would seem spontaneous, while in the winter weather the keeping quality is extended. Bacteria flourish with a temperature ranging from 80° to 100° F., their highest degree of reproduction being attained at the temperature of freshly-drawn milk. When milk or cream is immediately cooled down after milking and separation respectively, the gain in each case will repay tenfold the little labor and trifling cost. Cooled or refrigerated milk is shipped to England by the thousands of gallons from France and Denmark, and sold in the English towns in a perfectly sweet condition. Were scrupulous cleanliness enforced from the milking of the cow till the arrival of the milk or cream at the factory, together with judicious handling and cooling, no blame could be attached to the suppliers should inferior butter be turned out from the factory.

*Diseases Spread by Milk.*—Milk being the most favorable media for bacteria, germs causing disease find a ready home to carry on their dreaded reproduction. All contagious fevers can be transmitted from disease-stricken homesteads to healthy families through the medium of milk previously exposed to the affected air. On no account ought milk to be permitted to leave a place where any contagious trouble is prevalent. It is advisable, if milk is in any way suspected of contamination with pathogenic germs, to have it heated to a temperature of 180° F. for fifteen minutes. By so doing, all fever germs will be killed out. In the udder of the cow milk is not always sterile; the abhorred tubercle bacilli is sometimes to be found in abundance when an animal is suffering from the final stage of tuberculosis. In cases of inflammation of the udder, we also find the milk affected. Cow's milk for young children ought to be pasteurised, especially during the warm summer months when milk fermentation is of so common an occurrence, causing in many instances intestinal complaints.

*Compositions showing Relative Food Values of Waste Products.*

	Skimmed Milk.	Buttermilk.
	per cent.	per cent.
Water .....	90.10	91.2
Fat .....	.75	.5
Casein .....	3.50	3.5
Sugar .....	4.85	4.0
Ash .....	.80	.8
	100.00	100.0
	Separated Milk.	Whey.
	per cent.	per cent.
Water .....	91.0	93.31
Fat .....	0.1	.10
Casein .....	3.5	.27
Sugar .....	4.6	5.85
	(and acid)	
Ash .....	.80	.47
	100.00	100.00

The percentage of fat highest in skimmed milk and second in buttermilk, separated milk and whey being equal.

The percentage of casein and sugar is highest in skimmed milk, second in separated milk, third in buttermilk. Skim milk has the highest feeding value, buttermilk next, and separated milk next.

*Composition of Cream (Bell).*

	Low Standard.	High Standard.	Clotted Cream.
	per cent.	per cent.	per cent.
Water .....	67.93	37.62	33.76
Fat .....	24.44	58.77	59.79
Sugar .....	2.96	1.46	1.01
Casein .....	4.04	1.53	4.97
Ash .....	.63	.32	.47

**Cooling of Cream.**—Cream is much more difficult to cool than a body of milk, owing to the heat-retaining capacity of the globules of fat. With a body of cream registering a temperature of 60° F. the fat contained in it will be at a higher temperature if insufficient time has been allowed for cooling. This accounts for the oily texture of butter and loss of butter fat when cream is churned with fat globules in the heated and more liquid condition. Butter fat when once heated takes a considerably longer time than the other solids of cream to give up its heat.

**Straining of Cream.**—Straining of cream prior to churning is of much importance, as caseous matter is withheld in the strainer, and a more even consistency is obtained in the body of cream. Specked butter is caused by omitting straining with over-ripened cream.

**Ripening of Cream.**—To have cream at the "good" stage of ripeness means to have the proper degree of acidity developed. When milk has been separated in an advanced or sour condition the separated cream is deprived of the neces-

sary food for the good ferment—the bacillus acidi lactici—the result being that bacteria of an injurious nature have an undefended field open to them, and this opportunity is taken advantage of by the speedy reproduction of those unwelcome forms, giving rise to highly disagreeable flavors in butter. From cream got by the setting system superior flavored butter is obtained. This is due to the cream ripening in a thin layer, and in contact with a body of milk rich in sugar, and having the good ferment predominating. Pure air in contact with ripening cream increases the flavor of the manufactured butter. Ripening of cream ought never to take place in small cans, as various degrees of acidity are unavoidably obtained, giving rise to loss of fat in churning. It thus takes place in churning that the fat in the ripened cream becomes united and forms butter first, the fat in the less ripened or sweeter cream uniting later, which means that a high percentage of fat in a liquid condition must escape conversion into butter, and pass away in the buttermilk. The degree of acidity of cream for churning should be about .7 on the acidometer, when the highest quantity of butter, together with the best quality, will be obtained, providing all necessary conditions in the earlier stages receive attention.

*Pasteurisation.*—Pasteurisation is a name given to a system of heating milk or cream to a temperature ranging from 150° to 180° F. The effect of this high temperature is to kill out all common or non-spore-making forms of bacteria, thus extending the keeping quality of the product. Where pasteurisation is carried on at butter factories, refrigeration is absolutely necessary, and the ripening of cream by the addition of a starter or culture must be resorted to; the following being the method of procedure:—

Sweet milk is first heated to a temperature of 95° F., passed through the separator. The cream finds its way directly into the pasteuriser, and is there subjected to a temperature not exceeding 180° F. for five minutes. The pasteurised cream is immediately run slowly over a refrigerator, and into the settling tanks at a temperature of about 40° F. We have now got a cream perfectly sweet, free from acid-forming bacteria and odors and rich in food. In the settling tank cream is kept at this low temperature for a few hours, is afterwards raised to 60° F., and a starter added at the rate of 2 to 5 per cent., according to the time allotted for ripening, which generally ranges from eighteen to twenty-four hours. The method of pasteurisation is shortly described in the April issue of *The Journal of Agriculture and Industry*.

A starter is formed by taking 3galls. of separated milk and heating it to 170° F. for at least an hour; when this is cooled down to 70° F., a bottle of pure lactic culture is added, and the inoculated milk kept at 70° F. for twenty-four hours, or until coagulation occurs, when the starter is now ready for using. Fresh starters must be made daily, and the strength attended to.

Ripening, pasteurisation, sterilisation, and refrigeration will be more fully dealt with in another article.

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**AN EMERGENCY FODDER.**—On the Agricultural Show ground at Bordertown, a dry limestone rise, where eucalypts and exogenous pine trees have been killed by the latest drought, the *Tamarix gallica* is still perfectly green and vigorous. This is a shrub or small tree which seems to thrive in almost every soil and locality, and as it can be pollarded or lopped to any extent, and as the leaves are much liked by live stock when they have once acquired a taste for it, the "tamarisk" might with advantage be planted around gardens and paddocks—first, to serve as a wind break and to afford nectar for bees, and, secondly, to serve as a forage for live stock when other fodder fails. When pollarded in May or June the stumps produce very many long shoots, which can be used in the manufacture of hurdles, coarse baskets, crates, &c. When cuttings are planted about 95 per cent. will take root.

## ROYAL COMMISSION ON TUBERCULOSIS IN GREAT BRITAIN.

The Report of the Royal Commission on Tuberculosis has been laid on the table of the House of Commons, and the following are some of the most important recommendations made :—

### **Meat—Slaughter-houses.**

That towns and boroughs have power to deal with slaughter-houses, and, when public slaughter-houses are provided, no other places shall be used for slaughtering. After due notice owners of existing slaughtering-houses shall refrain from using them for such purpose.

Local authorities be empowered to require all meat slaughtered at other places, and brought into the district, to be taken to certain places for inspection, and a charge be made to cover reasonable expenses attendant on such inspection.

Inspectors shall be engaged for the public slaughter-houses to inspect all animals immediately after slaughter, and stamp the joints of all carcasses passed as sound.

It is recommended that it shall not be lawful to offer for sale the meat of any animal which has not been killed in a duly licensed slaughter-house.

No person to act as meat inspector until he has passed a qualifying examination before a prescribed authority on the following subjects :—

- (a) The law of meat inspection, and such by-laws, regulations, &c., as may be in force at the time he presents himself for examination :
- (b) The names and situations of the organs of the body :
- (c) Signs of health and disease in animals destined for food, both when alive and after slaughter :
- (d) The appearance and character of fresh meat, organs, fat, and blood, and the conditions rendering them, or preparations from them, fit or unfit for human food.

### **Tuberculosis in Animals intended for Food.**

The Local Government Board be empowered to issue instructions from time to time for the guidance of inspectors, which should cause a carcass or part thereof to be seized.

Pending the issuing of such instructions, the following principles should be observed in the inspection :—

The entire carcass and all the organs may be seized when there is miliary tuberculosis of both lungs ; when tuberculous lesions are present on the pleura and peritoneum ; when lesions are present in the muscular system or in the lymphatic glands embedded in or between the muscles ; when lesions exist in any part of an emaciated carcass.

The carcass, if otherwise healthy, should not be condemned, but every part of it containing tuberculous lesions shall be seized when the lesions are confined to the lungs and the thoracic lymphatic glands ; when the lesions are confined to the liver ; when the lesions are confined to the pharyngeal lymphatic glands ; when the lesions are confined to any combination of the foregoing, but are *collectively small in extent*.

In view of the greater tendency to generalisation of tuberculosis in the pig, we consider that the presence of tubercular deposit in any degree should involve seizure of the whole carcass and of the organs.

Of foreign dead meat every carcass should be seized in every case where the pleura has been stripped.

### Milk.

Notification of every disease in the udder of cows should be compulsory, whether in private dairies or those of which the milk is offered for sale. Power should be given to local authorities to take samples of milk and make analyses from time to time, and vendors be required to supply sufficient information as to the sources from which their milk is derived. Regulations should be made as to dairies, cowsheds, &c., and no cowsheds, byres, or shippens shall be permitted or registered in urban districts within 100ft. of any dwelling-house. In populous districts the following conditions shall be complied with before registration:—(1) an impervious floor; (2) a sufficient water supply for flushing; (3) proper drainage; a dépôt for manure at a sufficient distance from the byres; and fixed spaces allowed for each beast, according to the weight of the animal, and a minimum floor space of 50ft. to each adult beast, with sufficient light and ventilation, &c., &c.

The following part of the report is of especial value at this time, when the use of tuberculin is being so strongly advocated in the colonies as being so important an aid in ridding the cattle of tuberculosis:—

### Elimination of Bovine Tuberculosis.

We recommend that funds be placed at the disposal of Board of Agriculture and Veterinary Department in Great Britain and Ireland for the preparation of commercial tuberculin, and that stockowners be encouraged to test their animals by the offer of a gratuitous supply of tuberculin, and the gratuitous services of a veterinary surgeon, on certain conditions—(a) That the test be applied by a veterinary surgeon; (b) that tuberculin be supplied only to such owners as will undertake to isolate reacting animals from healthy ones; (c) that the stock to be tested shall be kept under satisfactory sanitary conditions, &c.

### WILLOWS.

Mr. F. Krichauff writes the following with respect to osier and other willows:—"The common Osier (*Salix viminalis*) is the best for banks subject to occasional inundations. Another kind is the Bitter willow (*Salix purpurea*), which in rich bottoms makes shoots up to 13ft. length in a year, and is much in demand in England, which imports about 4,400 tons at from £2 10s. to £3 10s. per ton unpeeled. Cuttings must be planted deep, so as to expose to the air hardly more than 6in. For cricket bats the Golden Osier (*Salix vitellina*) is the best, as it grows very fast and to a great size."

Mr. O. E. Tannert, a well-known caneworker in Adelaide, writes that osiers are in good demand at £14 to £24 per ton, according to size and quality, if peeled, and green at £6 to £7 per ton. To grow them, plant cuttings 18in. to 20in. long. If on river banks, plant the thick end towards the stream, with the smaller sticks behind. Leave them two years; then cut the first crop, which must be a light one, but the next will be extra good. Every seventh year reduce the stumps as much as possible, to cause new growth, else they will get too soft. To peel the wands, drive two rods of iron about 22in. long and a little thicker than a lead pencil into a block of wood; then pull the willow through and the bark will peel off. But the peeler must regulate the pressure on the wand whilst holding the ends of the rod in his left hand, else he will split the wand. [Before passing the rods through the peeler the willows are tied in bundles and the butts are laid in running water for a time, till the sap begins to rise, which causes the bark to run off readily. — Ed.]



## WEATHER AND CROP REPORTS.

**AMYTON.**—We have had 3in. of rain, and more promises. Season favorable for gardening. The wheat paddocks are already looking quite green, and with favorable weather we shall have good feed for stock in about a month's time. Since the rain a few farmers have started seeding again.

**ANGASTON.**—Splendid soaking rains again. Prospects of coming season very good. Lambing up to expectation. Pruning of fruit trees well advanced.

**ARTHURTON.**—During a week of wet weather nearly 5in. of rain was recorded. Seeding operations greatly retarded. Early-sown wheat coming on well; feed growing splendidly. Tanks and dams nearly all full.

**ASHBOURNE.**—Nearly 5in. of rain since last report. Land thoroughly saturated. Seeding almost completed, and season exceedingly promising. Weather is now cold, and vegetation is almost at a standstill.

**BALAKLAVA.**—Since last report we have had a series of soaking rains, nearly 2½in. for three weeks. Dams and tanks full. Seeding finished, and farmers busy fallowing. Wheat and feed coming along nicely. Wherever manure has been used it shows both on the crop and the feed from last year's dressing. Outlook very promising.

**BOULBROO SOUTH.**—Seeding is nearly finished, and some farmers are starting to fallow. The season is very favorable to growth of crops, and feed is coming on well, and promises to be abundant. Rain during month, 3.155in.

**BORDERTOWN.**—Splendid rains, best for three years. Rained without a break for fifteen hours on June 13, and showers for rest of week. Dams and tanks overflowing. Low land rather too wet. A larger area is being sown this year, the seed and manure drill being very extensively employed. Season bids to be very good.

**BOWHILL.**—Splendid rains during past few weeks. The soil has now received a thorough soaking, and much low-lying land has been submerged.

**CALCA.**—Early in month weather was dry and cold, but on 9th steady rain set in; over 2in. recorded. Wheat now appearing above ground. Owing to lateness of rain and absence of old feed lambing is not expected to be very good. Severe frosts followed the rain.

**CLARENDON.**—Splendid soaking rains have fallen; seeding is finished, there being a larger area than usual under crop. Early-sown crops are looking well, and feed is growing fast, but severe frosts are now checking growth. General appearances point to a good season. The value of the seed and fertiliser drill is becoming recognised in this district.

**DAWSON.**—The long-looked-for rain has come, nearly 3½in. being recorded for first two weeks of June. The rain has been very steady, so that it has all gone into the soil. Some land is still not thoroughly soaked. The wheat and grass is now springing, and, although the former is rather thin in places, farmers have been greatly relieved concerning the state of the seed so long in the soil.

**GAWLER.**—The season so far could not be better; as it is the ground has had a thorough soaking. Feed is getting plentiful, and the crops are growing splendidly, especially where manured. Seeding is finished. Cattle and sheep are doing well; there will be a good percentage of lambs. Early potatoes have done well, tubers large. Rainfall for June, to 20th, 3.680in. We had a very severe frost since.

**INKERMANN.**—Seeding operations nearly finished. Owing to favorable weather, more than usual has been put under crop, and some farmers will not finish seeding before the end of the month. The wheat drilled in looks well, and is in advance of that broadcasted. The weather has been cold, with two or three frosts, one very severe. Rainfall for four weeks, 2.850in.

**JOHNBURGH.**—We have been favored with splendid soaking rains, and dams and tanks are all full—the best rain for three years, nearly 4in. being recorded. The young wheat is coming up nicely, and as the drought has now apparently quite broken up we look forward to a plentiful harvest. The weather has been very rough and stormy, accompanied by fleeting showers with a bitterly cold wind blowing. Atmospheric appearances indicate more rain. Several farmers are again tilling, anticipating that the dry seasons are at an end.

**KANMANTOO.**—Splendid rain throughout the district during the month, for the week ending 18th about 4in. being recorded. Feed growing well where not too heavily stocked. Splendid prospect for coming harvest. Seeding nearly finished. Owing to grand early rains a much larger area of wheat has been put in than usual.

**KAPUNDA.**—Rainfall for May, 2½in., and good general rain this month. Crops looking well. Some farmers already fallowing. Sparrows very troublesome. Dairy cows scarcer than they have been for many years.

**LUINDALE.**—Splendid rains have fallen during the month, 3.350in., and a good grass season should be assured. Crops are coming on well. Lambing is progressing, and the percentage promises well.

**MEADOWS.**—Rainfall for June, over 6in. Prospects promising, crops and grass making good headway in spite of occasional frosts. Stock looking well, and supply of milk steadily increasing. Drilled and manured crops making better progress than broadcasted.

**MOUNT COMPASS.**—Splendid rains have fallen, testing the drains to their utmost capacity. Heavy weather uprooted much timber. Some gardens have been flooded.

**MOUNT REMARKABLE.**—Recent rains, nearly 7in. in three weeks, greatly improved our prospects. This is the best rain we have had for five years, and farmers look forward to some return for their labor.

**MURRAY BRIDGE.**—The wet weather during month has made much of the land too sloppy for seeding. The seed and fertiliser drill is being used to a large extent. Early-sown wheat is covering the ground well, but promises to become too rank. Stock doing well; feed growing nicely.

**NANTAWARRA.**—Lambing is about finished, and has been fairly satisfactory. Feed is growing well so that farmers should have their lambs in prime condition by the time they are large enough for market. Rainfall for June, to 20th, over 3in., the best for many years. Crops are nearly all up, and those put in with the fertiliser drills are much better than those broadcasted.

**ONETREE HILL.**—Seeding is almost finished; early crops look well. Stock improving in condition; grass plentiful. Rainfall for June over 4in.

**PETERSBURG.**—A great and favorable change has come over the prospect of the season since last report. For June, to 17th, 2·930in. of rain has been recorded, being nearly equal to the record of the previous five months of the year. The wheat is now coming up nicely; even those paddocks for which fears were entertained that the seed had perished are showing up, and, although a trifle thin, may yet make good crops, especially if the remainder of the season prove favorable. The weather is very cold, retarding the growth of vegetation somewhat.

**PORT ELLIOT.**—Over 6in. of rain fell during first two weeks of June, being more than, recorded for the whole of any June since 1889. Feed fairly plentiful, and although several frosts were experienced last month, on no occasion were they severe. A larger area than usual is being cropped.

**PORT LINCOLN.**—Since last report we have had grand rains, about 3½in. A large area has been put under crop, a good deal by means of seed and fertiliser drills. Feed and crops coming on nicely.

**PYAR.**—The rainfall for June, to 20th, 2·410in., is the best in any one month for over three years. All crops are looking their best, and the prospects are more promising than they have been at this time of year for the last three seasons. We are enjoying quite an unusual immunity from frosts, and this enables crops to put on a lot of growth.

**QUEEN'S OWN TOWN.**—Nearly 4½in. of rain recorded for four weeks ending June 14th, mostly in light soaking showers. This is the first real soaking rain for many years. Seeding is about finished, and many crops are up and looking well. The fertiliser drills are being used. Fallowing is becoming general.

**RICHMAN'S CREEK.**—For five months only about 2in. of rain fell, feed becoming very scarce, and little wheat showing. On June 9 steady rain fell, about 1in., and for week over 4in. was recorded throughout the district. This is the best fall since May, 1893. Feed is springing up in all directions, and the wheatfields are becoming green again. The improved prospects have induced a good many farmers to put in more crop.

**RIVERTON.**—We have had a splendid rainfall throughout the district; seeding operations are over. The early-sown crops are up and looking very healthy. If later conditions are favorable we should have a magnificent harvest. This is the first wet season since artificial manures were used in any quantity, and farmers are looking forward to great results.

**SADDLEWORTH.**—The good soaking rain during the last ten days has filled to overflowing waterholes and dams. Wheat is coming up very regularly. When the ground is rather damp and the drill not covering the seed well a rail dragged behind the drill has proved satisfactory. Rainfall—May, 4·010in.; June, to 20th, 3·200in.

**STOCKPORT.**—Splendid rains have fallen during last fortnight. Crops are doing well. Rainfall for June, to 20th, 2·900in.

**STRATHALBYN.**—Rainfall for year to June 15, nearly 8in., the wettest season since 1893. June rainfall, 2½in. Early-sown crops are up and looking well. Later seeding only just finished. Stock looking well on the whole, though the grass is not so good as it was a month ago, owing to frost and dry weather for a week or two.

**SWAN BEACH.**—Weather most favorable during past four weeks, nearly 5in. being recorded, and the ground is now thoroughly soaked. Seeding just finishing. Crops look well. The grass is also coming on well, and stock are in good condition.

**WOODSIDE.**—Very heavy rains have fallen this month, the rivers and creeks running bankers, but we are now enjoying beautiful fine weather. Seeding operations are fast drawing to a close. The crops that are above ground are looking well.

## FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford &amp; Company report:—

June 30th, 1898.

A day or two after the publication of our last report, general rains set in, extending over all the settled portions of the colony, cheering news coming to hand from every direction announcing at last a real break-up of the long drought, which in some districts has existed for nearly three years. The rainfall is the best and most general experienced for more than twenty years, and everywhere the subsoil has received a thorough soaking, dams and tanks being filled to overflowing, and feed everywhere becoming abundant. Genial weather followed the downpour, and altogether prospects are most cheering. At least an average area has been placed under crop in the colony, and as farmers have very widely adopted the seed drill and are manuring extensively, the prospects of the season are most auspicious.

Business, although still dull, has a healthier tone, reflecting the improved condition of things in the country.

The uncertainties of the grain market have been forcibly exemplified during the past month, commencing with the collapse in the American wheat market through the unexpected termination of the Leiter-Armour deal. This has been very much felt even in these colonies, American quotations made to customers usually supplied from Australia bringing down prices here considerably below what speculators reckoned on a couple of months ago. A drop of 25 per cent. in value has produced the usual result, holders of wheat now being more anxious to quit than when top prices were obtainable. Millers, however, even at present rates operate sparingly, as bakers had mostly well bought forward their supplies of flour. Bran and pollard have also fallen considerably in price owing to the plentiful supply of growing feed and the prospects of an abundant season. In feeding grains there is but little doing.

The light stocks of potatoes for time of year held throughout the colonies has attracted the attention of speculators, so that in this line the past month has witnessed a series of "booms." Values at moment are higher than we have seen them for some years past, and during the next three months at least this line, it is expected, will continue to rule at extreme rates. Meanwhile, consumption has been very much restricted by the advance in prices. Onions have also participated in the speculations of traders, and are ruling high in value.

Under the heading of dairy products, an average month's business has been put through, but although growing feed is very good in the butter-producing districts, supplies in this leading line have increased very slowly, giving grounds for the fears we have previously expressed that the loss of milkers in our dairy herds during the recent drought has more seriously affected the industry than was at first realised. Local supplies have increased, but this market is still dependent upon importations for a portion of its requirements. Values, however, have eased down within the month about 2d. per lb. on factory prints, and 1d. to 1½d. on imported bulk. Supplies of eggs reaching market have been altogether insufficient to fill requirements of exporters; and, although last season's top rates were not touched, the average since the beginning of the year has been higher. During the past few days a seasonable drop in price has commenced, and within the next month we may look for a fall of 40 per cent. to 50 per cent. Increasing quantities of imported cheese are beginning to reach market, stocks of local being confined to two or three factories. Further advance in price has been made; but, as selling rates are now on a par with value of imported, this line may be reckoned to have reached limit. For the time of year, slow business is doing in bacon, with supplies somewhat more plentiful, although there is no surplus, and none likely to be available for export this year. Almonds are finding better sale. Beeswax in good demand. Honey during the month has been scarce—another proof, if it were necessary, of the disastrous effect in almost every direction of the late bad seasons.

## MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, dull at 3s. 9d. to 3s. 10d. per bushel 60lbs.

Flour.—£11 to £11 10s. per ton 2,000lbs.

Bran.—9d.; pollard, 11d. per bushel of 20lbs.

Oats.—Local Algerian and dun, 2s. 2d. to 2s. 4d.; imported, nominal, 3s. 6d. to 3s. 9d. per bushel of 40lbs.

Barley.—Malting, 4s. 3d. to 4s. 9d.; feeding sorts, 3s. to 3s. 3d. per bushel of 50lbs.

Malt.—Local, 8s. 6d. to 9s. 6d. per bushel of 40lbs.

Chaff.—£3 5s. to £3 12s. 6d. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.

Potatoes.—Mount Gambiers, £10 to £10 10s.; Tasmanians, £11 to £11 10s. per 2,240lbs.

Onions.—£11 10s. to £12 per 2,240lbs.

Butter.—Creamery and factory prints, 1s. 6d. to 1s. 7d.; dairy and collectors' lines, 1s. 3d. to 1s. 6d. per lb.

Cheese.—S.A. Factory, large to loaf, 8½d. to 9½d. per lb.

Bacon.—Factory, cured sides, 8½d. to 8¾d. ; farm lots, 7d. to 8d. per lb.  
 Hams.—S.A. Factory, 7d. to 9½d. per lb.  
 Eggs.—Loose, 1s. 7d. ; in casks, f.o.b., 1s. 8½d. per doz.  
 Lard.—In bladders, 7d. ; tins, 6d. per lb.  
 Honey.—4d. to 4½d. for best extracted, in 60-lb. tins ; beeswax, 1s. 2d. per lb.  
 Almonds.—Soft shells, 3½d. ; kernels, 8½d. per lb.  
 Gum.—Best clear wattle, 2d per lb.  
 Carcass Meat.—Shop porkers, 5d. to 6d. per lb. ; good baconers, 4½d. to 5d. ; rough and heavy sorts, 3d. to 4d.  
 Live Poultry.—Good table roosters, 1s. 5d. to 1s. 10d each ; hens, 1s. 2d. to 1s. 4d. ; light and poorer birds, 1s. to 1s. 2d. ; ducks, 2s. 3d to 2s. 9d. ; geese, 3s. 2d. to 3s. 8d. ; pigeons, 5d. to 6d. ; turkeys, 5d. to 5½d. per lb., live weight.

## CENTRAL AGRICULTURAL BUREAU.

MONDAY, JUNE 13.

Present—Messrs. F. E. H. W. Krichauff (Chairman), Samuel Goode, W. C. Grasby, H. Kelly, T. Price, T. B. Robson, C. J. Valentine, and A. Molineux (Secretary).

### Donations and Exchanges.

The SECRETARY reported receipt of usual donations from agricultural departments, and 300 plants of *Laurus camphora* from the Queensland Acclimatisation Society.

### Cultivation of Osiers.

Mr. GOODE said he had, on behalf of the Blind Institution, inspected some land at the Finnis, near the river, which it was proposed to utilise for the growth of osier willows for basketmaking, &c. The institution used a very large quantity of willows, nearly all of which had to be imported, and as the land referred to was in every way suitable for their growth, a considerable area had been taken up, and would be planted at an early date.

### Manuring.

Mr. KRICHAUFF said that although fair success had attended the use of Thomas phosphate in this colony, he contended that much better results would be obtained if the manure were broadcasted. By putting it in with the seed, any excess over immediate requirements of the young plant was not available, as the roots extended beyond the manure, and consequently cannot make use of it. If broadcasted and thoroughly mixed with the soil, the roots as they grew would get fresh supplies of the fertiliser. It was also most important that where potash salts are applied it should be done some time before sowing, if the concentrated salts are used, and with the previous crop, or at least six weeks before sowing, if kainit is used.

Mr. GOODE said no one who had seen the effect of the manure being put in with the seed could doubt its utility. He believed, however, even better results would be obtained if the manure were placed, say, 1in. deeper than the seed. As to broadcastin<sup>g</sup> the manure, there were two very great objections. One was that you manure the weeds as well as the crop. The great advantage of the drill was that the wheat got the first benefit of the manure, and kept ahead of the weeds. Then much more manure would be required to give the same results if it is broadcasted. He considered the great point was to encourage vigorous root development at the first, and the plant would then stand the dry weather and give a satisfactory return, as the past three years' experience had proved.

Mr. KELLY considered it far better to apply the manure in the drill with the seed, otherwise the weeds, starting earlier than the wheat, would keep ahead and spoil the crops.

The CHAIRMAN said he was convinced that the heavier manuring, which would be necessary if broadcasted, would result in a heavier crop.

Mr. GOODE did not think it would in our average season, as we did not usually get enough rain to make a heavy crop. Then, too, they would find farmers very chary about putting on much manure, as a luxuriant crop was so much more liable to red rust.

The CHAIRMAN did not consider there would be any more damage from red rust on a luxuriant crop resulting from manuring with phosphates. The argument as to feeding the weeds could easily be answered by the farmer getting a clean seed bed.

Members generally thought it a most difficult thing to get over this trouble, as most of our farming land was foul, and that drilling the seed in with the manure was best under our conditions. It was also agreed that it would be better to place the manure about an inch deeper than the seed.

### Potatoes.

Mr. GRASBY reported that the potatoes received by him from the Bureau were planted at Balhannah, in Mr. J. C. Grasby's garden. Owing to the severe season they did not have a fair chance, but some of them promised to be well worthy of further trial. The following is a *résumé* of results:—

Best results were obtained from—Carter's Surprise: A very fine potato; shape, long oval; skin, light; eye, shallow. Bruce. Good shape, oval; skin, light; eye, shallow; skin shows signs of a slight scabbiness, which, however, may be due to the season. Magnum Bonum: Shape, good and even, large tuber; skin, light; eye, shallow. Early Rose: Oval in shape; skin, pink; rather deep eye; differs from Early Rose usually grown here.

The following varieties showed promise of good yield, but were faulty in some respects:—Ashton's Seedling: A brown potato, with rough skin and tendency to crack. Canadian: Very irregular in shape, and great tendency to knobs; skin, pink. The Vicar: Skin, rough; tuber, unsightly. Derwent: Irregular and wasteful shape. The poorest results were obtained from Sutton's Main-crop Kidney, Beauty of Hebron (differs from type usually grown under this name), Grampian, Superior, Peach Blow, Sutton's Early Regent, and Jubilee.

### Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

215. *Co-operative Dairies*.—The association of dairymen of the southern part of Schleswig embraces 130 dairies, with about 30,000 cows, mainly in Angeler. Altogether there are at present four associations in the duchies of Schleswig-Holstein, which comprise 378 dairies with about 100,000 cows. Of course there are many dairies not connected with the associations.

216. *Exportation of Cream*.—The firm of Potts & Woods, of Appleton, in Wisconsin, U.S., forwarded pasteurised cream to Liverpool and had it returned. It took thirty days, and the cream was quite fresh and sweet. They are going to export cream largely to England. Can we do the same? Will it pay better than butter?

217. *Forests in the United States*.—The state of New York has again purchased for forests in the hills of the state 250,117 acres of land for the sum of 921,690 dollars. We alienate frequently from our sparse forest reserves! And what are our landowners doing to have at least a sufficient supply of firewood?

218. *The use of Nitrate of Soda*.—While it is generally acknowledged that the whole quantity to be applied to a certain crop should not be used at one time, but better at three periods of its growth, it is not so well known that the leaves can be damaged by nitrate of soda, if it is distributed while they are wet. All artificial manures broadcasted should be distributed close to the ground if the weather is windy.

219. *Crows on Wheatfields*.—To prevent crows eating any grain, or pulling up the young plants, take 6ozs. of gas-tar, 6ozs. petroleum, and  $6\frac{1}{2}$  pints of hot water for 22galls. of seed wheat, or the same quantities of tar and petroleum, mixed with  $2\frac{1}{2}$  pints of hot water and 6ozs. of sulphate of copper dissolved in another  $2\frac{1}{2}$  pints of hot water, and mix with the grain, which will be protected and germinate just as well. The Lucindale Branch and some others

truly assert that crows damage wheatfields, &c.; but the great amount of good work done by these birds does not seem to be recognised. Professor Dr. Roerig recently examined the crows (or "crops") of 345 crows, and calculated that the insects therein found would have committed £172 10s. value in damage to crops, whilst the loss in seeds and other parts of plants would amount to no more than £22 16s.

**220. Consumption of Food and Comparative Milk Production.**—Results of experiments conducted in Denmark and in America demonstrate the importance of selection with regard to the thriftiness of each animal, as well as the quantity of milk and butter fats yielded by them. Except in the city and a few towns of South Australia, very few cows are fed exclusively in stalls or sheds. The results now to be quoted are of the greatest importance to all dairymen. Inferior cows cannot fail to greatly diminish the gross profits. At Missouri Experimental Station nine Jersey and three shorthorn cows were tried for one year. The worst of the Jerseys gave 3,811lbs of milk, and the best cow 8,118lbs., against an average of 5,646lbs. by the shorthorns. Comparing value of food consumed with value of butter produced, 1lb. of butter from the worst Jersey cost 13·3 cents, and from the best Jersey only 8·2 cents, whilst the butter from the shorthorns cost 19·1 cents per pound for food to produce it, to say nothing of the labor, leaving a profit of not quite 6 cents. At Utah fifteen cows were tried for a year. The food of the worst cow cost 11·42 cents for each pound of butter, and that of the best cow 5·91 cents, the latter giving a profit of £10 5s 6d. against £2 18s. 9d. for the former; and there was a difference of 2,883lbs. of milk. At the Pennsylvania Station nine cows were tried for 150 days. The worst cow gave a profit of 18s. 2d., and the best £7 10s. 7d. In Denmark thirty-three cows, 4 years old, were tried for one year in the district of Vesen, and the food for the worst cow cost 1s. 2d. per pound of butter, and only 8½d. for the best cow. With some smaller herds the difference was still greater; the food of some cows cost only 7½d., of one 1s. 3d., and of another 1s. 4½d. per pound of butter. As the butter from 180 cows in this district realised on an average 1s. 0½d. there were actually forty-three cows amongst them that consumed more in fodder than the amount got for their butter. In the district of Alling fifty-four cows, 4 years and more old, were tried for one year, and while the profit for the best cow was £6 18s., for the next best £5 11s., and for most of them from £3 10s. to £5, there was a cow which gave only a profit of 7s. 2d., and one that consumed £1 4s. worth more food than the amount received for her butter. In these trials in Denmark one day's grazing was taken as equal to 12lbs. of oil cake, bran, or corn, or 270lbs. of turnips, or 125lbs. of cabbage or mangolds, or 30lbs. of meadow hay, or 36lbs. of hay made from vetches, or 48lbs. of straw, or 120lbs. of green feed.

**223. Sulphuric Acid for Farmyard Dung and Urine.**—A paper by Dr. Hoffmann, of the Royal Agricultural Institute of Lisbon, shows that farmyard dung gives frequently disappointing results. Sheep dung, however, if kept in a well trodden down and somewhat moist condition, which prevents to some extent the admittance of the air, seldom fails, especially in cold soils, and farmyard dung constantly well trodden down retains its ammonia much better. So soon as the excrements leave the animals and come into contact with the litter, the bacteria on the straw commence their decomposing labors, and if the dung lies long enough in a heap or in the soil the nitrifying bacteria, so very plentiful everywhere, alter the ammoniacal nitrogen into nitric nitrogen. The fermentation of the urine by bacteria causes the uric nitrogen to become volatile ammoniacal nitrogen. To prevent their work, strong acids or alkalis, which are sure poison for them, should be used. Urine, if treated with phosphatic or sulphuric acid, and in well covered pits, if kept for nine months, will diminish the loss of nitrogen by 45 per cent. Professor Wagner says that, by adding 1 per cent. of sulphuric acid to fresh urine, no ammonia is made or nitrogen lost; but before using such strongly acid liquid it is necessary to add lime or a phosphate.

### Inspection of Dairy Herds.

Mr. VALENTINE referred to the necessity for the examination by a competent person of the dairy herds of the colony, especially those from which milk and butter for the local supplies are obtained. All suspected cows should be tested for tuberculosis. There would be no difficulty in carrying this out; it only meant a little trouble and expense, and for that they should not allow milk from unhealthy cows to be made use of. Then there was the question of our butter export trade. There should be absolutely no suspicion of any taint. The average of disease in our herds was nothing like so bad as in the dairying countries of Europe and other parts, where the cattle had to be kept for so long in byres. Here they lived out in the open air, which gave little encouragement for such diseases as tuberculosis. The inspector at Mount Gambier had done a lot of work in this direction, but it should be general.

Members all supported, and it was pointed out that the Bureau had already made several recommendations on the subject. It was resolved, "That, in the opinion of this Bureau, all cows from which the milk supply of Adelaide and other corporate towns, and the cows from which the supplies are derived for dairies from which the butter is exported, should be periodically examined and tested when necessary with tuberculin, to prevent the supply of milk being contaminated."

### **New Members.**

The following gentlemen were approved as members of the undermentioned branches:—Lipson, Mr. H. Brougham; Mylor, Messrs. A. Phipps and O. A. Witt; Swan Reach, Mr. E. Micke; Amyton, Messrs. H. B. Turner and A. Stone; Woolundunga, Mr. G. Lewis; Koolunga, Mr. R. Lawry; Johnsburg, Mr. J. R. Masters; Brinkworth, Mr. A. W. Morrison; Eudunda, Mr. C. L. E. Lutz; Lyndoch, Messrs. G. H. Hill, R. H. Payne, R. Ross, and S. Sage; Gladstone, Messrs. Jas. Greig, J. H. Sargent, and Jno. Prior; Crystal Brook, Mr. J. F. Bryson; Calca, Mr. R. H. Squire.

### **Reports by Branches.**

The SECRETARY reported receipt since previous meeting of fifty-seven reports of Branch meetings.

## **REPORTS BY BRANCHES.**

### **Yorke town, May 13.**

Present—Messrs. J. Koth (Chairman), C. Domaschenz, A. Jung, J. Latty, and J. Davey (Hon. Sec.).

**SUPERPHOSPHATE.**—Mr. Domaschenz wished to know how farmers could make superphosphate for themselves from old bones. [See *Journal of Agriculture and Industry* for August, 1897, page 70, and page 615 of March issue.—GEN. SEC.]

### **Clare, May 13.**

Present—Messrs. J. Christison (Chairman), W. Kelly, R. Graham, J. Treleaven, J. T. Hague, W. Kimber (Hon. Sec.), and two visitors.

**INSECT PESTS.**—It was decided to urge on orchardists in the district the necessity for taking every precaution to prevent the spread of codlin moth, and where old apple trees were growing to grub them up, or take such steps as will prevent them becoming a harbor for the pest. The Inspector of Fruit had been communicated with, and urged to take vigorous and prompt action to compel the owners of infested orchards to take the necessary steps to eradicate the pest. Mr. Christison said he had had fair success in dealing with red spider by spraying with lime, salt, and sulphur mixture; but he found it an arduous task, as the hatching of the eggs extended over so lengthened a period. Mr. W. Böcker (visitor) said that in West Australia they used resin wash with success for this pest. He also stated that the fruit fly was a serious trouble in West Australia. The only satisfactory treatment was to spread sheets under the trees to catch the maggots as they left the fruits. The Chairman said a beetle which hid in the soil in the daytime had been doing much damage at night to roses and other plants. Mr. Hague said this insect had eaten the bark on some of his peach trees, while the Hon. Sec. had had some of his apple trees denuded of their leaves. It was thought that spraying with Paris green

would prevent the damage. [Probably curculio beetle. Spray trees with 1oz. Paris green, 1lb. fresh lime, and 12galls. fresh water. On garden plants hand-picking at night is the only feasible remedy.—GEN. SEC.]

**SOILS.**—Mr. Böcker tabled six samples of soil, illustrating the different classes prevailing in the agricultural areas of West Australia. These were examined with much interest, differing as they did very much from our South Australian soils.

### Mylor, June 4.

**Present**—Messrs. W. H. Hughes (Chairman), S. Roebuck, W. Nicholl, P. P. Probert, S. W. Jackman, R. S. Mundy, T. Mundy, W. T. Elliott, W. G. Clough (Hon. Sec.), and nine visitors.

**ANNUAL REPORT.**—The Hon. Sec.'s annual report showed that during the year the attendance at the monthly meetings of the Branch has been 11·5 members and 9·3 visitors, and he thought they had every reason to believe that their labors had led to some beneficial results. Seventy-nine samples of products grown by members from Bureau seeds, &c., have been tabled. Four practical papers have been read and discussed, and the Branch was represented at the Annual Congress and at the Hills Conference of Branches. Messrs. W. Nicholls, P. P. Probert, and W. G. Clough were appointed Chairman, Vice-chairman, and Hon. Sec. respectively for ensuing year.

**KALE.**—Mr. Probert tabled plant of Giant Palm-tree kale, grown from Bureau seed. This plant weighed 1cwt., and he found it a splendid fodder for cattle, and well worthy of cultivation.

### Norton's Summit, June 4.

**Present**—Messrs. J. Jennings (Chairman), J. Bishop, J. J. Bishop, Thos. Playford, jun., J. Hank, J. Pellew, C. Jennings, J. Jennings, jun., J. Cowling, and W. H. Osborne (Hon. Sec.).

**INSECT PESTS.**—The Chairman read article on "Spraying for Codlin Moth" from report of Tasmanian Council of Agriculture. Other articles on laws dealing with injurious insects were read and discussed. Members disapproved of the suggestion that the certificate of a Government inspector in the exporting country should be accepted as evidence that the fruit was clean, as it was quite possible for some insects to be undiscernible when shipped but at the same time to be in a condition to develop during transit. The members endorsed the action of the Minister of Agriculture in adopting measures to prevent the introduction of the fruit fly, and expressed the hope that, rather than relax any part of the regulations they should be even more rigorously enforced.

**RHUBARB.**—Mr. J. Bishop read a paper on this subject, of which the following is the substance :—

I have no desire to say which is the best way to cultivate, or which is the best kind to grow, but simply to explain the methods that I have found most suitable, after trying different ways and being guided by the experience of others. To grow rhubarb successfully a great deal depends upon the situation, as it requires the morning sun and also requires to be sheltered from the sun during the heat of the day; therefore I prefer planting on a hillside facing east, with the top of the hill bearing north, as it is then protected from the hot sun during the day and also from the north winds.

The classes of rhubarb grown are almost as varied as the situations upon which they are grown, as most growers have a variety of their own, adapted to their particular soil and locality, as a kind that may do well with one grower may be worth but very little to his neighbor on the adjoining section. The usual way the different varieties grown in this neighborhood have been obtained has been by saving the seed from a good plant, and again



selecting the best plants for seed, and when a suitable variety is procured to work from the plants by dividing the crowns and raising the stock in a nursery-bed for planting out each season, thereby ensuring a uniform variety, which cannot be obtained from seedlings.

Rhubarb will do well on many different kinds of soil when properly treated. A wet bottom is not at all suitable if the crop is required to remain any length of time. I prefer planting in a loamy surface with a good clay subsoil, and when planned with a fair amount of manure in such soil it will last several years without being renewed.

Manuring is one of the chief points in growing rhubarb successfully, as it will stand as much as most people care to supply it with without being overdone. Either artificial or stable manure will suit, and perhaps both together would suit better. In preparing the land I trench it 2ft. deep, keeping the surface soil on top, and when breaking up the bottom spread coarse bonedust at the rate of 1cwt. to the rod, letting it mix with the soil and remain well in the bottom; or, with stable manure, use about half a ton of short well-rotted manure to the rod, keeping it as near the bottom as possible. When beds are prepared in that manner the roots will go down, and have something to support them during the dry summer months. When planting I lay out the rows 3ft. x 4ft., to give room for the roots to spread beneath, and the leaves to grow above, without being overcrowded; this also allows sufficient air for the stalks to retain their color.

By planting at that distance, the horsehoe can be used where the land is not too steep, and by working both ways the surface can be kept loose and clean with but very little hand hoeing. Being too wet to get a horse on the land during the winter, it requires digging during June or July, when bonedust at the rate of 1cwt. to ten rods should be dug in. It is best not to pull any leaves during the first season, in order to give the plants a better chance to get strength, and a good pulling can then be depended upon for the following crop. I should prefer using stable manure if it could be obtained as cheaply as bonedust; but when the price paid in Adelaide for manure and the expense of carting up the hills is considered, after which it has to be kept and rotted and again carted out on the land, bonedust is really cheaper, as the cartage and handling of bonedust on the land is but trifling compared with that of stable manure.

The following is a fair estimate of the cost of planting an acre with rhubarb:—

	£	s.	d.
Breaking up new land in winter and clearing stumps at 3s. per rod . .	24	0	0
Preparing land in summer and working in the manure at 2s. per rod	16	0	0
Eight tons bonedust at £5 5s . . . . .	42	0	0
Three thousand two hundred plants at 10s. per 100 . . . . .	16	0	0
Digging and planting, 6d. per rod . . . . .	4	0	0
Total . . . . .	£102	0	0

Before a crop is obtained, there is the cost of digging and attention for one year at, say, 1s. 3d. per rod or £10 per acre, to be added to the cost of planting.

An animated discussion ensued on the reading of this paper, which members considered an admirable one. Before giving his estimate of cost, Mr. Bishop asked each member to write down what, in his opinion, would be a fair estimate for their respective soils. This was done, and the average worked out at £128 13s. 4d. per acre as the cost of preparing land for and planting one acre with rhubarb, to which the extra expense of cultivation for one year, and the cost of harvesting the crop must be added, before any returns can be expected.

### Brinkworth, June 2.

Present—Messrs. R. Cooper (Chairman), H. Weckert, W. Wundke, A. L. McEwin, J. Graham, W. H. Pearce, J. F. Everett, J. Stott (Hon. Sec.), and three visitors.

SEED DRILLS.—The Chairman initiated a discussion on this subject. He had purchased a drill, and from the way it worked was strongly of opinion that they would prove very useful in this district, though he had not had sufficient experience to warrant him in recommending others to go in for them. Mr. Weckert said he had put in 500 acres with the drill this year, some with and some without manure, and had also sown some wheat broadcast. In all cases the drilled seed came up earlier and appeared stronger than the broadcast. He had on three consecutive days put in twenty-three acres with the drill, and

right through had averaged twenty acres a day. He was quite satisfied that he had saved enough seed this season by using the drill to pay the cost of that implement. Mr. Graham was satisfied that the saving of seed would justify the use of the drill, but he was dubious of applying phosphates, as it helped to exhaust the land. He would prefer good farmyard manure. Members generally agreed that the drills were of great benefit if manure was applied with the seed. [By applying a phosphatic fertiliser to a soil deficient in phosphoric acid, the plants are enabled to appropriate nitrogen, potash, &c., which may be abundant, and thus a much heavier crop will result. Naturally, this heavier crop will remove more potash, nitrogen, &c., from the soil; but the larger crop cannot possibly be produced unless there is a sufficiency of each substance in the soil. It is like building a brick house—if the lime, sand, and water are abundant, and bricks deficient, you must either supply more bricks and thus *impoverish* the supply of sand, lime, and water, or else build a smaller house.—GEN. SEC.]

### Dowlingville, June 3.

Present—Messrs. R. A. Montgomery (Chairman), J. Phelps, G. Mason, T. Illman, J. Burkin, R. Willing, T. Kenny, W. T. Holland, H. Crowell, T. Roberts, and J. L. Broadbent (Hon. Sec.).

WHEATS.—Members reported that Baroota Wonder and Hawke's Clubhead wheats had proved to be very suitable for this district.

MANURES AND SEED DRILLS.—Members reported that they found it necessary to use wood ashes or other dry material with English superphosphate to get it to run regularly in the drill. Members were of opinion that in all tests of seed and fertiliser drills, the awards should not be made until the crop is up. Considerable discussion took place on the good and bad qualities of the different makes of drills in the district. It was stated the ammoniacal liquor mixed with sifted stable manure was giving very good results in various trials with wheat and vegetables. The cheapness of this fertiliser is a great recommendation. Mr. Willing said he had mixed wood ashes with super, left it for some time before using, and it had apparently not injured the manure as the crop was as good as any other. He had also mixed lime and super together and got a fine crop. Ashes and lime together did not give such good results. Tests of super, ash, and no manure side by side resulted as follows:—Super, very good crop; ashes, good; no manure, very poor. Burnt earth drilled in with the seed gave good results. Several spoke favorably of results from wood ashes, but the drawback was that sufficient could not be put on with the drill. Mr. Phelps wished to know whether commercial manures lose strength by keeping, and Mr. Illman asked best way of fixing the ammonia in stable manure when in a pit. [Most of these fertilisers lose strength, more or less, by keeping. Generally the phosphoric acid becomes less soluble, and any nitrogen is liable to volatilise and be lost. Addition of lime in any form to superphosphate will cause it to become much less soluble. To prevent the loss of ammonia in farmyard manure, litter of various kinds, such as straw, leaves, dry weeds, &c., to absorb the urine, are valuable. Gypsum scattered on the stable floor and drains, about ½ lb. for each horse daily, will prevent smells and loss of ammonia. In the pit, the floor of which should be watertight, the manure should be kept damp to prevent heating, occasionally turned, and a little dry soil, wood ashes, gypsum, or kainit scattered on the heap when fresh manure is added. Kainit and wood ashes add to the value of the manure in the form of potash. The former should be used at the rate of 1 lb. per day for each horse from which the dung is obtained. If possible the pit should be roofed to prevent access of too much moisture. As the urine is richer than the solid part of the dung, it should be drained into the pit if not absorbed by the use of straw, &c.—GEN. SEC.]

**WEEDS IN CROPS.**—The Chairman and Mr. Foggo reported success in destroying weeds by harrowing after the crop is up. Mr. Roberts said he used the harrows upside down after the crop was up to break the clods. Mr. Mason did not consider the crop put in properly unless the land was harrowed immediately after drilling. Mr. Holland thought it would pay to have the rows further apart in order to allow room for working the soil to destroy the weeds.

**WILD OATS FOR FEED.**—Mr. Illman stated that last year he stripped the wild oats on his land while green, and found it better feed for horses when mixed with "native" chaff than if left for hay. When stripping he emptied it in small lots, and allowed it to dry considerably before putting it into the heap. The heap required turning occasionally to prevent it going fusty, although even in that condition his horses eat it ravenously. There was a lot of nourishment in wild oats. Mr. Phelps said he reaped wild oats last year, and agreed with Mr. Illman's remarks.

**OFFICERS.**—Messrs. R. A. Montgomery and J. L. Broadbent were re-elected Chairman and Hon. Sec. respectively for ensuing year. A vote of thanks was accorded to Mr. and Mrs. Montgomery for their hospitality in entertaining the members during the year, the meetings being held at their homestead.

### Lyndoch, June 3.

Present—Messrs. H. Kennedy (Chairman), W. J. Lawes, W. J. Springbett, R. Loveridge, J. Mitchell (Hon. Sec.), and three visitors.

**DAIRYING.**—The Chairman read a short paper on this subject, which was well discussed.

**EXHIBITS.**—Mr. Payne (visitor) tabled branch of apricot tree, about four years old, grown on sandy scrub soil without irrigation. The Chairman showed sample of Cape barley in ear, 3ft. high, sown for a green crop.

**LEMON STOCK.**—Mr. Payne wished to know whether lemons should be worked on lemon or orange stocks [On orange stocks. The bitter, or Seville, oranges make the best stocks.—GEN. SEC.]

### Mount Remarkable, June 1.

Present—Messrs. H. B. Ewens (Chairman), S. Challenger, A. Mitchell, G. Yates, C. E. Jorgensen, W. Girdham, W. Lange, T. P. Yates, and T. Casley (Hon. Sec.).

**MANURES.**—Considerable discussion on this subject took place. Mr. T. P. Yates considered best results were obtained by spreading green manure on the land just before fallowing, as the first rains would start the rubbish, which would be then ploughed under and enrich the land. The fresher the manure the better. He did not favor rotting it first in a heap, as although there would be less weeds, it meant more labor and less value in the manure. Mr. Challenger considered it would be better to apply manures as a top dressing, and not to plough it in. Mr. Lange said he got better results from top-dressing potato crops than when the manure was dug in. Mr. Mitchell thought spreading green manure was wasteful, as the most valuable constituent, ammonia, was nearly all lost. Members decided to ask Professor Lowrie to visit the district and give an address on manures. [Ammonia is not produced until fermentation has occurred. If unfermented dung is placed on the land and ploughed under soon after, there will be very great saving of nitrogen.—GEN. SEC.]

**Port Pirie, May 31.**

Present—Messrs. E. J. Hector (Chairman), J. Lawrie, F. Humphris, W. Mallyon, T. Gambrell, P. J. Spain, and R. J. Ferry (Hon. Sec.).

**FIELD TRIAL.**—It was decided to arrange for a field trial of cultivating implements at an early date, in connection with the North-Western Bureau, Field Trial Society.

**THICK V. THIN SOWING OF WHEAT.**—The paper on this subject read by Mr. Hector at previous meeting was again discussed. Mr. Humphris said he stated at previous meeting that he had heard, on reliable authority, of 20lbs. of wheat per acre being sown with satisfactory results not that he had done it himself. Mr. Lawrie said he certainly would not sow more than  $\frac{1}{2}$  bush. of wheat per acre with the drill, but would put in as much as  $\frac{3}{4}$  bush. broadcast. He did not agree with Mr. Welch as to thick sowing.

**Johnsburg, May 7.**

Present—Messrs. F. W. Hombsch (Chairman), M. L. Read, W. McRitchie, T. Thomas, T. A. Thomas, T. Potter, W. James, and T. Johnson (Hon. Sec.).

**OFFICERS.**—The Chairman and Hon. Sec. were re-elected for ensuing year.

**PAPER.**—Mr. T. A. Thomas read a paper on "The Establishment of a Sinking Fund for Farmers."

**HAMES.**—The Chairman initiated a discussion on the draught of the hames on horses, which in many cases was, in his opinion, set too low. This was, he thought, the cause of many animals not taking readily to the collar, and at times adopting a peculiar gait. Members agreed, and suggested placing the draught as near the centre of the shoulders as possible, while extra care should be taken in this respect with young animals.

**RAINFALL.**—For four months ending April 30, 0·640in.

**Morgan, June 4.**

Present—Messrs. Jackman (Chairman), A. Stubing, L. Stubing, R. Windbank, E. Jacobs, E. French, J. Bruhn, C. F. W. Pfitzner, A. Dennis, and J. Wishart (Hon. Sec.).

**FODDER PLANTS.**—Mr. Pfitzner reported having had very satisfactory results from White Kaffir corn at Gillen. With one watering at sowing time it produced a strong plant with well-filled heads, and he strongly recommended it for extended cultivation in this district. He had also had satisfactory results from Cowpea, which he thought worth a fair trial here.

**INSECT PESTS.**—Mr. Kakoschke tabled branch of almond tree attacked by an insect which caused ragged longitudinal wounds in the bark about  $\frac{1}{2}$  in. in length, and stated that a pear tree was similarly attacked. On removing the rough bark, small red insects are found.

**RAINFALL.**—For five months ending May 31, 2·460in.

**Nantawarra, May 30.**

Present—Messrs. C. Belling (in chair), A. F. Herbert, J. Nicholls, E. J. Herbert, T. Dixon (Hon. Sec.), and one visitor.

**SEED DRILLS AND FIELD TRIALS.**—Some discussion took place on different makes of seed and fertiliser drills. Matters in connection with forthcoming field trial were dealt with,

### Mundoora, June 3.

Present—Messrs. W. Aitchison (in chair), T. Watt, J. J. Vanstone, G. Haines, W. Tonkin, W. J. Shearer, N. J. Francis, and A. E. Gardiner (Hon. Sec.).

**TREE-PLANTING.**—Considerable discussion on this subject took place. Members have found by past experience that to get satisfactory results the trees must be put in early in this district, otherwise the hot weather is on them before they are established. The sugargum has given best results here, and Mr. Tonkin urged members to plant a few in the corners of all their paddocks, where they would not only make good shelter for stock, but would be an ornament to the district. He believed that if every farmer would do this the result of so much timber on the climate would be distinctly beneficial, especially in the matter of rainfall. Mr. Aitchison said unless trees were planted early on their light soil, the drifting sand in the dry weather cut them too much, and they seldom recover; if, however, they become established and their roots go down they grow quickly, especially sugargums.

**MANURES.**—A large quantity of commercial fertilisers has been used in this district this season, and some of the members have put their crops in with the drill. Mr. Tonkin said he was trying the effect of superphosphate as a top dressing after the crop is well through the soil.

**STOCK COMPLAINT.**—Mr. Vanstone said one of his cows has warts on the teats, and asked if any members knew how to cure this. Mr. Watt recommended applying a strong solution of bluestone after milking. [If these are only warts bluestone would be as likely as anything else to get rid of them. Caustic might also be tried: but it will be necessary, whichever is used, to wash the teats before milking.—GEN. SEC.]

### Gladstone, June 4.

Present—Messrs. J. Tonkin (Chairman), J. H. Rundle, J. Sheppard, J. Brayley, J. King, E. Coe, C. Gallasch, W. A. Wornum, B. Griffiths, J. Milne, (Hon. Sec.), and one visitor.

**FIELD TRIALS.**—Matters in connection with the Bureau Field Trial Society were considered. It was decided to ask the importers of the new disc ploughs to exhibit them at work in this neighborhood.

**EXHIBIT.**—Mr. Gallasch showed cutting of White Crystal grape vine 13ft. 9in. in length.

**MILD-CURED BACON.**—Members wished to know whether this process could be carried out on a small scale, without expensive machinery. [No. Refrigerating machinery, insulated chambers, steam engine, singeing furnace, and other accessories are required.—GEN. SEC.]

### Port Elliot, May 28.

Present—Messrs. C. H. Hussey (Chairman), P. O. Hutchinson, E. Wood, W. E. Hargreaves, W. E. Darwin, H. Green, H. Pannell, and E. Hill (Hon. Sec.).

**APPLE BITTER-PIT.**—The General Secretary wrote that the only treatment he could recommend for apple bitter-pit was to destroy infected fruit and spray with Bordeaux mixture. The first spraying should be just before the buds burst, and the second and third at intervals of three or four weeks, using the summer strength mixture.

### Crystal Brook, June 4.

Present—Messrs. W. J. Venning (Chairman), J. C. Symons, R. Pavy, E. Pope, W. Natt, W. Hamlyn, E. Dabinett, George Davidson, J. Chambers, J. Forgon, and George Miell (Hon. Sec.).

FIELD TRIAL.—Matters in connection with proposed field trial of cultivating implements were dealt with, and the Secretary was instructed to ascertain what assistance the Government would give to field trial societies.

### Elbow Hill, June 7.

Present—Messrs. E. Wake (Chairman), C. G. Ward, H. T. Styles, H. Dunn, J. Harvey, D. McKenzie, J. Spence, sen., W. Ward, J. Ellaway, sen., W. Spence, J. Foulds, C. L. DuBois, W. Beinke, T. Story, G. Wheeler (Hon. Sec.), and sixteen visitors.

FIELD TRIAL.—It was decided to co-operate with Boothby Branch in holding a field trial of seed-drills at an early date.

SELECTION OF SEED WHEAT.—Mr. Styles read a short paper on this subject, in which he dealt with his experience with seed wheat on scrub land. He considered attention should first be given to choosing perfectly mature, sound grain. When any sample containing cracked grain has to be used, it should be well screened, and the refuse kept for feed for horses, pigs, or fowls. Early sorts should be sown, as the scrub land being rich in potash the crops will grow rapidly, and are better able to resist the north winds, which are so frequent in this district, than if the slower maturing varieties are chosen. Amongst the best of the early wheats are Steinwedel, Early Show, Twenty Weeks, Venning's Rustproof, and Bearded. An occasional change of seed is beneficial; when possible obtain it from a district where the soil and climate are different. Seed wheat should be stored in a dry place, and if kept free from insects will remain in good condition for five or six years. By keeping seed that has proved to be good for two years, a change of seed is not so soon necessary. Considerable discussion ensued, several members disagreeing with Mr. Styles's idea as to sowing all early varieties, as they considered some of the later rust-resisting varieties should be sown. Mr. Spence said in his eight years' experience Ward's Prolific wheat had come out best, the early sorts being second. Mr. DuBois said it was necessary for every farmer to find out for himself which varieties suited his own locality best. Mr. Wake read a short paper, in which he recounted his experience in endeavoring to improve character of his wheats by selecting the best heads, sowing the grain, and then again selecting the best of them for further cultivation.

CAROBS.—Mr. Ellaway wished to know whether it was necessary to graft the carob tree in order to obtain fruit, and if so which system of grafting should be adopted. [Female carob trees will bear without grafting, provided there are male trees growing near by; but where there are more male trees than are required for purposes of fertilisation, these should be cut down and grafted with scions from the female trees. One male plant to ten female plants is sufficient. Probably side-grafting will be found to be best, being more easily done, and giving equally good results as cleft-grafting.—GEN. SEC.]

DOG-PROOF FENCING.—Mr. McKenzie read a statement giving facts and figures in connection with the proposal to erect a vermin-proof fence from Elliston to Franklin Harbor, showing that the whole cost of construction and maintenance would be met by a tax of 5s. per square mile per annum. He strongly advocated the suggested fence as the only satisfactory solution of the

dog trouble, without which it was nearly impossible to keep sheep. Mr. DuBois agreed that an effective fence round the district would make the keeping of sheep decidedly profitable to the farmer. The Chairman thought much of the country proposed to be enclosed was too poor to bear the expense, but on a vote being taken a majority were in favor of the proposed fence.

### Boothby, June 7.

Present—Messrs. J. T. Whyte (Chairman), E. Bradley, F. Mills, J. R. Way, H. G. Evans, A. Turnbull, J. Bell, R. Chaplin, and R. M. B. Whyte (Hon. Sec.).

**THIN SOWING OF WHEAT.**—Considerable discussion took place on paper read by Mr. E. J. Hector, of Port Pirie Branch, on this subject. Mr. Turnbull said he had thrown away a small fortune since he started farming by sowing too much seed. For years he never sowed less than a bushel of wheat to the acre, but now he only sowed half that quantity, and got better results. The Chairman said he allowed ten bags of seed to 100 acres when the seed is good and of a fair size. It was resolved that, in the opinion of this Branch, thin sowing was far the best for this district.

**WILD DOGS.**—Mr. Mills thought it would be possible to trap a number of dogs by herding sheep in a small enclosure roofed over with pig-proof netting. The dogs would jump on the top, and he did not think they could free themselves. Members thought the plan worth trying. [The Hon. Sec. reports that the plan has since been tried by some of the members, but so far without any result.—GEN. SEC.] Members thought that as dogs were now very plentiful they could be thinned down by poisoning.

**WATER CONSERVATION.**—The estimate of cost of bringing water into the district, as proposed at previous meeting, was considered, and it was decided to ask the Conservator of Water to furnish cost of pipes alone, as the farmers interested would furnish all the labor and do the work under the supervision of an officer of the Department.

### Mount Pleasant, June 10.

Present—Messrs. G. Phillis (Chairman), H. Dragomuller, J. F. Miller, J. Maxwell, H. T. Hull (Hon. Sec.), and one visitor.

**BINDER V. STRIPPER.**—A short discussion on this subject took place at previous meeting, members being in favor of the stripper, and were of opinion that the straw left on the land was good feed for stock, and also when rotted acted as a manure.

**RAINFALL.**—For April, 2.350in.

**OFFICERS.**—Messrs. G. Phillis and H. T. Hull were re-elected Chairman and Hon. Sec. respectively for ensuing year.

**GRUBBING MALLEE.**—Mr. Maxwell read a short paper on this subject. When he first commenced grubbing, he got a good sound stringybark lever, 27ft. long, and about 1ft. in diameter at the thick end. It was well mounted, with 18in. between the pulls. Some years later when the mounting gave way he had it welded together, making it 3in. shorter, that is 15in. between the pulls. Although only 1½in. less at each side of the fulcrum, the horse could break the chain much easier, or lift a larger stump than before. The chains are of good quality, ½in.; a light horse is equal to the strength of the chain. If there is any special knack in grubbing, it is in the starting of the stump; then, instead of pulling the stump right out, hook on to another as soon as it is started, and again on to another, and so on. He had often trailed out half a dozen at a time

this way. Sometimes they had to deal with stumps 4ft. to 5ft. across, which could not be got up without a great deal of chopping. In such cases they used to get a good pine post, 6ft. to 7ft long and 1ft. in diameter at the thick end. This was set in a hole at the foot of the stump, and then a chain, with a claw to hook it up at any length, was put twice round the stump and the post close to the ground, and then hooked on to the chain from the lever to the top of the post and pulled. If grubbing instead of mullenising had been more generally adopted on heavy clay lands, the mallee country would be far more productive now. The Chairman said the grubbing might have been better, but the expense would have been a very serious matter. Mr. Dragomuller said they must remember that there was a great difference in the mallee. Stump-jumpers would pull out a lot of the smaller stumps, but would never tear out the grey mallee roots.

### Petersburg, June 4.

Present—Messrs. W. Miller (Chairman), F. W. Sambell, R. Cochrane, W. Heithersay, H. Earle, W. Waters, J. Wilson (Hon. Sec.) and three visitors.

DEATH OF MEMBER.—Feeling reference was made to the loss sustained in the death of Mr. R. McPherson, who had been an active member of the Branch since its inauguration in 1890.

STOCK COMPLAINT.—Mr Cochrane said he had procured another milch cow and placed it on his farm, so that if it was similarly affected as his other cattle were there might be an opportunity of finding out the cause. Mr. Waters was of opinion that the trouble was partly due, as in the case of sheep, to allowing the stock free access to the straw stack. The Chairman said Mr. Geo. Ferguson, of Jamestown, had treated a cow attacked in a similar way to Mr. Cochrane's with an application of hot turpentine to the brisket and lower part of the abdomen, with the result that the animal recovered. Another cow affected received similar treatment along the back, also recovered.

WATER CONSERVATION.—Mr. Heithersay read a paper on this subject, and a short discussion followed. At request of the members, Mr. Heithersay offered to read the paper at the Tenth Annual Congress, to be held in Adelaide in September.

VEGETABLES.—Mr. W. T. Clarke, a local blockholder, sent very good bunch of turnips, the growth of tops being extraordinary. Members could scarcely believe that such growth was possible under such adverse circumstances.

### Gawler River, June 6.

Present—Messrs. A. M. Dawkins (Chairman), T. P. Parker, J. Hillier, A. Bray, D. Humphries, H. Roberts, J. Bushbridge, F. Roediger, J. S. McLean, H. Roediger (Hon. Sec.), and three visitors.

BUNT IN WHEAT.—A discussion took place on this subject. The Chairman said that if seed sown were left uncovered and rain came on it was often badly bunted, while the seed sown on the same day and worked under before rain falls proved free from bunt. In reply to Mr. Roberts, members did not think that wheat reaped rather green would be more subject to bunt than thoroughly ripened grain.

ROLLING CROPS.—In reply to questions, some members thought rolling the crop on land that sets tight is not beneficial, unless it is very lumpy; but rolling would benefit mallee or any other land of a loose nature. If rolling causes such land to set, it should receive a light harrowing at once. Mr. Parker



advocated rolling stiff soils before sowing. The Chairman said he had tried the harrows upside down instead of the roller, and found it better on crops intended to be stripped.

**FALLOWING.**—Most members favored very early fallowing. The Chairman thought failure was often due to the working necessary to thoroughly pulverise the land and destroy the weeds not being finished in time. The Hon. Secretary considered it a mistake to always plough the same depth. He advocated going a little shallower than usual one time and deeper the next to prevent a hard surface or pan forming in the bottom of the furrows.

**PRUNING.**—Mr. McLean asked the best time to prune apple, pear, apricot, and orange trees. Mr. Bray said the deciduous trees should be allowed to ripen their wood, while oranges should be cut when necessary while the sap is most dormant, say March or April, or in August.

**OFFICERS.**—Messrs. A. M. Dawkins, T. P. Parker, H. Roediger, and J. Bushbridge, were re-elected chairman, vice-chairman, hon. secretary, and assistant secretary, respectively.

### Colton, June 4.

Present—Messrs. P. P. Kenny (Chairman), E. Whitehead, A. S. Bartlett, M. S. W. Kenny, J. L. Denison, W. J. Parker, W. A. Barnes, W. L. Brown, G. Mayers, John Shipard, W. McElder, R. Hull (Hon. Sec.), and three visitors.

**OFFICERS.**—Messrs. P. P. Kenny and R. Hull were re-elected chairman and hon. secretary for ensuing year.

**SUMMER FODDER CROPS.**—Mr. Packer read a paper on this subject, of which the following is the substance:—

After the bitter experience of 1897, when we lost stock of all description through want of feed, due to insufficient rainfall, I do not think any one will deny that it will pay to grow fodder crops. Owing to the farms being overstocked, and to the ravages of the rabbits, most of the bunch and spear grasses have been eaten out, and only the lighter sorts remain, and these are destroyed by the first hot winds. It is very plain that we must either keep less stock, in order to give the natural herbage a chance to recover, or grow feed to provide for bad seasons. When we have a good season, and the summer is cool and moist, we are not too ready to admit the necessity for this; but the experience during the past few seasons will not be soon forgotten. Although, of course, the growing of summer crops means some expense and trouble, which will at times bring in no return, still we can generally grow something, and in good seasons when we do not actually need the feed, it will still pay us to grow it either to feed horses, cattle, sheep, or pigs, or to preserve as ensilage for the next season. If a farmer is to be disheartened because of one failure, he certainly will not grow summer fodders in this district; but if he looks to the average results from such crops over a series of years, and estimates his loss through not growing such crops, he will not doubt the necessity for them, if for no other reason than to stop the importation of butter and bacon into the district. Here we have a large farming district with a fair average rainfall, and yet we have to get a portion of our supplies of butter and bacon from elsewhere, even in a good season. This certainly should and could be rectified, and instead we should send quantities of such products to Adelaide. There are other by products of the farm that would meet with a ready sale in the city that we should produce, but until we make some provision for food for stock during the summer and autumn we will remain as we are. Last season the rainfall was 7in. below the average. On September 1 I planted red and white Kaffir corn received from the Central Bureau; this came up on 1st, was not irrigated in any way, and only cultivated sufficiently to kill the weeds. The red reached a height of 3ft. 6in., and the white 2ft. 6in. As I wanted the seed I did not cut them at all, but one stalk of the red got broken off by the wind, and was out close to the ground. It at once threw up six stems, and grew until cut by the first frost; but with the rain and warm weather it made a fresh start from the roots. The rainfall during growth was as follows:—September 0.890in., October 0.730in., November 0.020in., December and January nil, February 0.760in., or a total for six months of less than 24in. As a drought-resisting fodder plant, the red Kaffir corn must take the foremost place; the white did best after the February rains. I am sure the former will pay to grow with our average rainfall and deep cultivation, and if grown will go a long way towards placing us in a position to supply our local wants, if not to give us a surplus of butter, bacon, &c., for export.

Considerable discussion ensued, members being agreed as to the necessity for growing additional food for their stock. Mr. Barnes said he had very poor results from both kinds of Kaffir corn last season, but Johnson grass grew splendidly. Mr. Packer said he would not advise anyone to grow this plant in their gardens, or on land required for anything else, as it spread very much, and was most difficult to eradicate.

### Port Lincoln, May 20.

Present—Messrs. S. Valentine (Chairman), J. D. Bruce, J. Telfer, G. Dorward, W. Hutcherson, J. Puckridge, W. Laidlaw, W. E. Goode, and J. Anderson (Hon. Sec.).

**FARM HORSES.**—Mr. G. Dorward read a paper on this subject, of which the following is the substance:—

Horses at work on a farm should be provided with a comfortable stable to go into, and proper feed, more especially during the winter months. On some farms in this district no such provision is made, but the horses after doing a hard day's work are turned into an open yard, with no shelter whatever, and while feeding stand shivering with the cold; such treatment often results in the loss of a valuable horse. Good stabling is a good part of the feeding. The horse that is well stabled and well fed will not get knocked up if otherwise fairly treated, while the horse with only the open stockyard as a shelter, lasts but a short time, and the thoughtless owner says it is a useless soft animal. In such yards one will often see the mud a foot deep, and on that a forkfull of hay is thrown, or perhaps a bag of cocky chaff, and the poor horse has to make the best of it. The horse is the most useful animal on the farm, and as their feed is the only pay they require, they should have the best we can afford to give them, and if a horse is properly cared for you cannot work him out with fair play. Horses that are worked on the farm should be groomed at least twice a day with currycomb and brush, or even a bunch of clean straw will do nearly as well if properly used. For a stable nothing is better than a stone one; a good stable can be made with galvanised iron, and, failing that, in a district like this where teatree and scrub are plentiful, get a few strong forked sticks, place scrub between to form the walls, and a good shelter can be made with a coating of straw on top as a roof; but these makeshift stables I do not like, owing to risk of fire, but there should be shelter of some kind for the working horse. Two or three old wheatbags sewn together, or a piece of canvas, with a strap round the chest of the horse to prevent it slipping backward, and another under his tail to prevent it slipping forward, and sursingle (a strip of bag would do) round his waist will keep the horse fairly comfortable in the cold winter nights.

Considerable discussion ensued, members generally agreeing with the writer.

### Forest Range, June 2.

Present—Messrs. J. Vickers (Chairman), G. Monks, A. Green, H. Waters, J. Sharpe, J. Caldwell, H. Caldicott, C. Stafford, J. B. Fry, J. G. Rogers, S. A. Collins, W. Cherryman, R. M. Hackett (Hon. Sec.), R. Caldwell, M.P. (Woodside Branch), and six visitors.

**ANNUAL REPORT.**—The Hon. Secretary's annual report showed that since the inauguration of the Branch in August ten meetings had been held, with an average attendance of 10·6 members and three visitors. Eight papers have been read and discussed, and an address given by the Inspector of Fruit. Delegates from Branch attended conferences at Cherry Gardens and Strathalbyn, and reported to meetings. Messrs. J. Vicars, J. Green, and R. M. Hackett were re-elected chairman, vice-chairman, and hon. secretary, respectively, for the ensuing year.

**QUARANTINE OF STOCK.**—It was resolved that this Branch cannot at present support suggestion of Port Elliot Branch, that the Government should bear portion of the cost of quarantine of imported stock.

**BAG OF CHAFF.**—Members were of opinion that the legal weight of a bag of chaff should be fixed at not less than 40lbs. net.

**QUEENSLAND FRUITS.**—Mr. Caldwell read a very interesting paper on Queensland, from a fruitgrower's point of view, in which he described the physical and climatic conditions of that colony, and illustrated the natural consequences of such conditions. He was of opinion that most of the temperate fruits which grew in South Australia, to such perfection, would never be grown on a large scale in Queensland, and that for such fruits as pines, bananas, passion fruit, mandarins, &c., South Australia would always be a customer. There were a number of very serious pests in Queensland which were not existent in South Australia, fortunately for our growers, and every precaution should be taken to prevent their introduction, for while he did not think the worst of them would ever get a firm footing here, it was essential that they should have no opportunity of doing so. In regard to the prospects of Queensland, he was most favorably impressed, and thought the sooner the colonies as a whole decide upon a just system of interchange of commodities the better for all concerned. A number of questions concerning sugar-cane, bananas, fruit-fly, &c., were asked and answered, and Mr. Caldwell stated that the Tasmanian apples he had eaten during his journey were, in his opinion, not equal in flavor to South Australian. In regard to wheatgrowing, although there were large areas of land in Queensland suitable as far as soil and position went, the fact that much of it was liable to flooding, and that heavy rains often come in November, causing heavy damage by rust, would, he considered, make it impossible for Queensland to ever become a very large producer of wheat. There was in South Australia, between the Macdonnell Ranges and Port Darwin, large areas of the richest soils, equal to anything in New South Wales or Queensland. A vote of thanks was accorded to Mr. Caldwell for his paper.

### Calca, June 4.

Present—Messrs. Jas. Bowman (Chairman), W. Wilcott, A. B. Smith, A. Newbold, F. W. Freeman, D. P. Thomas (Hon. Sec.), and six visitors.

**FARMING AS AN ART.**—Mr. Thomas read a paper on this subject to the following effect:—

Many farmers complain of the trouble they have in getting their sons to follow farming instead of going in for clerkships, and swelling the already overcrowded, underpaid, and so-called "respectable" situations. Farming is not the life of drudgery that it is supposed to be. The most prosperous farmers we know are not drudges, but bright and energetic men who are always buying improved machinery, attending agricultural meetings, &c. They work regular hours, are always amongst the first to finish their seeding and harvesting, and they are never rushed for time. A farmer is not going to be ruined because he is a member of the Agricultural Bureau, or because he subscribes to one or two agricultural papers. A farmer is more free than an artisan. He is his own master, and can have a day off whenever he wants it, whilst the artisan, clerk, &c., must always be at his post at the appointed time. Again, the farmer has a variety of pursuits throughout the year, and the artisan has a round of work that becomes as monotonous as the tick of a clock in a sick room. There is nothing in farming that is crude or undignified. What better could a man wish for than a little farm? He grows his own vegetables, has his own cow, pigs, and fowls. I am not referring to haphazard farming, as that is almost always a life of drudgery. Let a farmer combine a little science with his experience. He should not select bad land, as cultivating that is a waste of time. If he gets a piece of good land and works it well he will, with ordinary care, succeed. You will sometimes hear people sneer at what they term "model farming." A reasonably wise farmer will always avail himself of an opportunity to inspect a model farm, so that he may obtain some knowledge that will be of use to him. If he has good land, and finds out what crops are most suited for it or what manure it requires, makes all his improvements sound and strong, tills his land well, has his paddocks small and evenly divided, crops them periodically and systematically, has a nice little house with a kitchen garden at the back and a flower garden at the front, he should be as happy as a king. Let him spend his nights in his own

circle and amongst his own family. Let him read and study good papers, and his home will become his paradise; his sons will not be so anxious to fly off to the cities, and procure other occupations. The housewife has the hardest lot as a rule, upon the farm; but a careful husband will relieve her of a lot of the duties that befall the average farmer's wife. You will sometimes see a tradesman who knows nothing about agriculture start farming; he will make a few mistakes at the outset, but when he has learned the art of farming, his early systematic habits will be put into the farm, and he will prosper where others who have been brought up to the life in careless haphazard fashion will fail, thus proving that farming is an art that needs intellect, education, and good taste to be at all profitable. Scientific farming is not so difficult as one would imagine. There are so many good books upon it, and so many good agricultural journals, that a farmer may obtain all the information he desires at a small cost. Let him not always follow the worn rut of correctness by keeping to the old style, rather let him try to improve upon it. It is better to err by being too radical than too conservative. Conservatism only breeds stagnation and checks any advancement. The mere details of when to sow and when to reap do not constitute "farming." But how to make farming pay during seasons of drought requires much knowledge and thought, together with strict economy, and the use of the best improved labor-saving machinery, implements, and appliances. A lengthy discussion ensued, and it was decided to hold a field trial of seed-drills and gang-ploughs about the end of September.

### Baroota Whim, June 4.

Present—Messrs. F. H. Flugge (Chairman), T. J. Simper, T. C. Bessen, M. Pillion, A. Roneberg, and C. W. Hoskin.

HON. SECRETARY—Mr. C. W. Hoskin was appointed Hon. Sec. for ensuing year.

BUSINESS.—Some discussion ensued on best means of increasing the usefulness of the Branch. Members regretted that the protracted drought has so seriously hampered their work, and trusted the present season would soon change for the better. It was decided to meet every two months for the present.

### Stansbury, June 4.

Present—Messrs. Alex. Anderson (Chairman), J. Henderson, J. Antonio, J. Sherriff, P. Anderson, C. Faulkner, and Geo. Sherriff (Hon. Sec.).

BUNT.—Mr. P. Anderson showed wheat ear with bunt ball on one side and good grain on the other. It was decided to ask Professor Lowrie for the explanation of this.

GYPHUM AS A FERTILISER.—Members wished for information *re* making phosphatic manures by using well-rotted sheep dung or gypsum as a base. Mr. P. Anderson called attention to statement that gypsum was a splendid manure for vines, and greatly increased the yield. Members wished to know whether gypsum was a good fertiliser, and, if so, the quantity per acre that should be used. [No; gypsum is not a fertiliser. Under certain conditions its application to the soil has a marked result on the crops, but this is due to its indirect action. Potash is often in the soil in a condition unavailable for the crop, and gypsum will so act on it as to make it readily available. It also corrects alkalinity, and acts in a mechanical way on soils containing much humus; and the satisfactory results referred to were obtained on peaty soil rich in humus, which was not, until acted upon by the gypsum, in suitable condition for plant food. As a source of phosphatic manures it is useless, for it contains no phosphates. Lime phosphates are valuable because of the phosphoric acid they contain, and not because of the lime. Sheep manure contains a small percentage of phosphoric acid, and is a valuable manure. By the addition of substances containing phosphoric acid it could be made more useful for wheat crops, but it would not be a profitable undertaking. It would be cheaper to apply the manures separately.—GEN. SEC.]

**WEEVILS IN WHEAT.**—Mr. C. Faulkner stated that a small grub had got into his seed wheat, and had eaten the germ out of a good quantity. They formed a web, like spiders, on the heap. The Hon. Secretary said some years ago he had a lot of wheat damaged in the same way, and he found that plenty of ventilation in the barn cured the trouble. [Place the seed in a tank or other vessel that would hold water—but *do not* put any water in it—then place saucers on top of the grain about 4ft. apart; put about a wineglassful of bisulphide of carbon in each saucer. This will fume off, the fumes will sink through the grain, and kill every insect within twenty-four hours, without the least injury to the grain. The tank should not be much larger than is necessary to hold the grain.—GEN. SEC.]

### Lyrup, June 7.

**Present**—Messrs. A. Thornett (Chairman), F. E. Chick, A. Weaver, T. Nolan, W. Haly, A. Pomeroy, D. J. Bennett, O. Klemm, P. Brown, W. H. Walling, W. H. Wilson (Hon. Sec.), and eight visitors.

**RAINFALL.**—Recorded for May, 0.420in.

**EXHIBITS.**—Mr. Chick tabled specimens of Qucen and Siletta oranges of good quality grown on the settlement.

**APRICOTS FOR DRYING.**—The Hon. Secretary read a short paper on cutting apricots for drying. The whole secret of success is cleanliness, clean cutting, and placing the fruit with the cut side up. Members agreed that care should be taken in picking the fruit when just sufficiently ripe to handle and dry without losing shape, and that no dew should be on the fruit when picked. Some of the members thought it would pay better to export the apricots as pulp instead of drying them.

### Auburn, June 3.

**Present**—Messrs. E. M. Dudley (Chairman), J. Hean, S. Ford, G. R. Lambert, W. Klau, J. B. Schober, and Dr. J. W. Yeatman (Hon. Sec.).

**CLIPPING HORSES.**—The Hon. Secretary read a short paper on this subject. He admitted clipping had its advantages and disadvantages, and he proposed to give them the benefit of his experience with light horses. If the horse is fresh off the grass, weak from any cause, or out of condition, it takes much time and trouble to get him into anything like condition, but remove his heavy winter coat and the animal will rapidly improve. As a tonic, clipping is unrivalled. A clipped horse is more comfortable, and will do nearly a third more work on a third less feed than a similar animal with a heavy coat. After a hard day's work he comes in clean and dry, ready to eat his food without delay, requires much less grooming, and is in very little danger of developing sore shoulders. On the other hand, an unclipped horse finishes his day's work in a sweat. If left outside he is liable to catch cold, and if stabled sweats still more, eats in a half-hearted way, does not rest in comfort, and is consequently in a spiritless condition in the morning. A young fiery horse, likely to jib if he feels cold, or play up from excess of animal spirits, should not be clipped. The quiet, steady, reliable horses which can be depended on to be stanch after an hour's waiting in a cold wind, or to face the rain, are those which benefit most from clipping. One disadvantage of clipping is that if a horse so treated requires spelling before the warm weather comes he cannot be turned out, but this can readily be overcome by rugging him and feeding, as a clipped horse completely rugged requires very little feed to keep him in condition, and it would often be an advantage to have a two or four horse team

clipped and stabled in condition for any work that may be required. This is specially so when there is much winter work, as in orchards and vineyards. A stable closed on three sides is quite warm enough. A stout canvas rug would cost about 15s., and a pair of clippers, say, 10s., so the cost is very little. Clipping should be commenced above the hock and knee and not below, as it has a tendency to encourage grease. Horses that had galled shoulders in spite of every care he could give them were clipped each winter, and he had had no further trouble with them. Whether clipping is advisable or not depends upon the temper of the horse and the work he has to do. To get a maximum of work and comfort, with a saving of feed, there is nothing to equal clipping, and it is besides the best preventive of colds, coughs, and rheumatism.

### **Meadows, June 6.**

**Present**—Messrs. J. Catt (Chairman), T. B. Brooks, W. Pearson, T. Usher, G. Rice, W. J. Stone, G. Usher, G. Ellis, H. V. Wade, T. A. Buttery, W. A. Sunman (Hon. Sec.), and three visitors.

**OFFICERS**—Messrs. J. Catt and W. A. Sunman were re-elected Chairman and Hon. Sec. respectively for ensuing year.

**BIRDS AND SEED WHEAT**.—Mr. Rice tabled grains of wheat which, after pickling, he mixed with tar before sowing to prevent the birds from taking it. He found this very successful.

**CULTIVATION OF PEAS**.—Mr. Pearson initiated a discussion on the advisableness of sowing peas in the field with 1 in. between the rows. Some members thought this too far apart, while others favored it.

**SPAYING COWS**.—Members reported that the cows spayed last year by Mr. S. Ralli were still keeping up their average supply, and they were inclined to think that spaying will pay if only the best milkers are operated on.

### **Bute, May 31.**

**Present**—Messrs. A. Schroeter (Chairman), H. Schroeter, W. H. Sharman, E. Ebsary, J. J. Birch, S. Lamshed, M. Stevens, W. Langford J. H. Barnes, M. Hall, R. C. Commons, D. Green (Hon. Sec.), and one visitor.

**ANNUAL REPORT**.—The Hon. Secretary read his annual report for past year. The following officers were elected. Chairman, Mr. W. H. Sharman; Vice-chairman, Mr. S. Lamshed; Hon. Sec., Mr. M. Hall. Other routine business was transacted.

### **Naracoorte, June 11.**

**Present**—Messrs. O. Hunt (Chairman), S. Schinckel, H. Smith, D. McInnes, and D. Caldwell.

**OFFICERS**.—Mr. O. Hunt was re-elected Chairman for ensuing year. Mr. D. McInnes was elected Hon. Sec. in place of Mr. R. M. Paris, who resigned on account of press of work.

**CODLIN MOTIL**.—The Chairman reported that owing to being fully occupied with other work he had been unable to go round the district with the local inspector, and the only thing they could do now was to see that the orchardists scraped off the rough bark from their trees, and removed everything likely to afford shelter to the caterpillars.

**PESTS.**—Members reported that foxes were becoming very numerous and troublesome in this district, also that eaglehawks were working destruction amongst the young lambs. Stinkwort is spreading in the district.

**STOCK COMPLAINTS.**—Mr. Schinckel stated that two of his cows were suffering from what Inspector Williams said was dropsy. Under his instructions he had given them a mixture of salt and sulphate of iron in water, and they were now all right.

### Gumeracha, May 30.

**Present**—Messrs. W. A. Lee (Chairman), R. P. Scott, W. Cornish, A. Moore, W. Jamieson, W. Green, Dr. J. R. Stephens, and Dr. G. Nicholls (Hon. Sec.).

**SCIENCE CLASSES.**—Messrs. Scott, Stephens, and the Hon. Secretary reported that their endeavors to form these classes had not met with success. Members deplored the lack of interest shown by the young people, and decided that another effort should be made to get them to take the matter up.

**PAPER.**—Mr. Cornish read a paper on "Observations and Conversations with Mother Earth and her Progeny."

**THOMAS PHOSPHATE.**—Mr. Jamieson stated that he had come across pieces of metallic lead in this manure, the result being that the cones of the drill were broken. [This "adulteration" could scarcely have been intentional, as lead fetches about three times as much as Thomas phosphate.—GEN. SEC.]

### Finniss, June 15.

**Present**—Messrs. T. Collett (Chairman), W. W. Heath, A. E. Henley, P. Gooding, R. J. Ness, S. Collett (Hon. Sec.), and one visitor.

**SEED DRILLS.**—Members met at Mr. Henley's farm for the purpose of inspecting the working of a "Superior" seed and fertiliser drill. The drill was putting in 45lbs. of wheat and 1cwt. of fertiliser per acre, and members expressed satisfaction at the way in which it performed its work. Mr. Henley has put in about 100 acres with the drill, and has tried a number of experiments in order to ascertain what quantity of seed per acre gives best returns. He invited the members to meet again at his farm in October, when they would be able to see for themselves the results of these experiments.

### Appila-Yarrowie, June 3.

**Present**—Messrs. J. H. Bottrall (Chairman), J. Wilsden, J. M. Grant, C. W. H. Hirsch, W. C. Francis, A. Fox, J. Daly, J. O'Connell, N. Hannagan, P. Lawson, J. H. Klemm, and C. G. F. Bauer (Hon. Sec.).

**BRANCH CONFERENCE.**—It was decided that the Annual Conference of the Northern Branches be held at Gladstone about the end of February, 1899.

**KITCHEN GARDEN.**—The Hon. Secretary read a short paper on this subject. He advocated selecting the site for the garden close to the homestead. It should be enclosed with netting to keep out fowls and other farm stock, as well as vermin. Plenty of water was necessary. He liked to mix different manures produced on the farm together and incorporate them thoroughly with the soil, working to a good depth. About 50yds. of wire netting will enclose a plot 13yds. square, enough for home requirements, leaving gate about 3ft. wide so that the wheelbarrow can be taken in. In this district, where the farmers are dependent on the rain, the first lettuces and radishes should be ready to cut the latter end of March or the beginning of April. Cabbages

should be planted about March ; carrots and turnips sown in March for early crop, and in May for later crop. Second crops of cabbages and lettuces should be put in in May. Mr. O'Connell said it was important that the garden should be sheltered from the north and west winds. To obtain any degree of success with vegetables, the plants should be grown from seed selected by the grower from the best plants each year.

### Koolunga, June 3.

Present—Messrs. T. B. Butcher (Chairman), J. Sandow, J. Button, A. Craig, E. J. Shipway, W. J. Jose, J. Freeman, R. Lawry, J. Butterfield, J. Jones, G. Pennyfield (Hon. Sec.), and two visitors.

OFFICERS.—Messrs. T. B. Butcher, J. Sandow, and G. Pennyfield were re-elected Chairman, Vice-chairman, and Hon. Sec., respectively.

MILK YIELDS AND BUTTER VALUE.—Mr. Jones, after reading a table giving result of a trial in Canada of milk trials with two cows each of Holstein, Jersey, and Ayrshire breeds, and one cow each of Shorthorn and Guernsey breeds, proceeded to give his own test for one day with fifteen cows in full milk. One of his cows gave 30lbs. milk, of which 24lbs. were required to make 1lb. of butter, or about 9lbs. per week, whilst another cow yielded only 16lbs. milk per day, equal to only 3½lbs. butter per week. A half-bred Alderney cow gave 27lbs. milk, which yielded 1lb. butter from 19lbs. milk, or 10½lbs. butter per week. The fifteen cows gave 370lbs. milk for the day, averaging 1lb. butter fat to each 26½lbs. milk, or 5½lbs. of butter per cow per week. By weeding out five of the worst cows the average for the other ten would be 7lbs. butter per week, whilst the average per cow for the five "weeds" would be 4lbs. At different periods of the year the milk varies in regard to the percentage of butter fats from individual cows. A cow which in spring and early summer yields 1lb. butter fat in 23lbs. of milk, would give milk in autumn and early winter which would require 3lbs. or 4lbs. more to yield 1lb. butter, owing to the scarcity and dry nature of the feed. This showed the necessity of providing more nutritious food. Milk from the Channel Island cows (Alderney, Jersey, and Guernsey) contains larger fat globules than that of many other breeds ; therefore the cream rises more rapidly and surely, and the butter also presents a higher color and better appearance. He questioned if there was any district in the colony where, upon the ordinary pasturage, a higher percentage of butter fats was yielded from milk than in Koolunga during spring. The quantity yielded by dairy cows could be increased by breeding only from the best milkers, and by using none but pure sires of the best families of dairy cattle. Mr. Shipway said he had a cow that yielded 16lbs of butter per week, but he did not know of what breed she was. Mr. Sandow said he knew of a cow that gave 21lbs. of butter in one week. In reply to question, Mr. Jones said poor milk would weigh heavier than rich milk.

### Forster, June 6.

Present—Messrs. A. Johns (Chairman), J. Sears, H. Fidge, J. Retallack, S. Sears, J. R. Bolt, C. Topsfield, J. D. Prosser, W. Johns, F. Johns, J. Johns, W. H. Bennett (Hon. Sec.), and one visitor.

FALLOWING.—Mr. A. Johns read a short paper on this subject. He strongly advocated early fallowing, commencing in July and finishing before the end of August, while the soil is still moist. Work the fallows well with



the scarifier. Fallow to a depth of 5in. or 6in. where the land is deep enough. A three-furrow plough should cover not more than 2ft. at a time. Turn the furrows over flat so as to cover the weeds. In putting the crop in, cross-plough and turn the seed in about 3in. deep. Scarifying the seed in may be quicker, but the other will give better results in this district. A discussion followed, members generally agreeing with Mr. Johns.

### Willunga, June 4.

Present—Messrs. W. J. Blacker, (Chairman), J. A. Jacobs, Dr. Counter, Thomas Pengilly, James Valentine, W. J. Binney, Thomas Atkinson, R. Russell, A. Slade, and C. Bray (Hon. Sec.).

WHEAT V. HAY.—Mr. W. J. Binney read a short paper on this subject, to the following effect:—

This matter has come in for considerable discussion of late, some farmers favoring growing for grain and others for hay. Personally he favored more attention being paid to wheat, as there was not sufficient produced in the district for local requirements. The machines now in use enable the farmer to get the full benefit of his crop. Most of it should be cut with the binder and then thrashed. The straw in the sheaves, as well as the chaff, can all be made use of to a large extent on the farm. Care should be exercised in the selection of the varieties of wheat to grow. Complaints have been made about inferior flour of late, and some have put it down to the use of "headed" wheat; but he considered this incorrect, as good wheat properly treated with the header was of the best quality. He did not intend to advocate growing wheat to the exclusion of hay, as, owing to prices varying so much, one is more or less profitable than the other according to season. It was also impossible to grow wheat for grain on dirty land, but the cleanest land should be reserved for wheat, and the rest cut for hay. The use of the seed and fertiliser drill will largely help the farmers in this district to clear their land of wild oats.

An interesting discussion ensued, members generally being of opinion that wheat should be grown in conjunction with hay in this district. Discussion to be continued at future meeting.

### Lucindale, May 31.

Present—Messrs. E. Feuerherdt (Chairman), S. Tavender, W. Dow, A. Lobban, A. Maheson, E. Dutton, G. Newman, A. Dow, H. Langberg, and H. J. Deeble (Hon. Sec.); also Mr. Findlater, of Naracoorte Branch.

COULIN MOTH ACT.—Members consider this Act is defective, because it does not sufficiently protect clean districts. It was thought that no fruit should be allowed to leave an infected district until it has been officially inspected and declared to be free from disease. Notice should be given by the growers before sending away cases of fruit. [In some of the American States no fruit or plants are allowed to leave infected orchards, nurseries, &c., until they are thoroughly disinfected.—GEN. SEC.]

EXHIBITS.—The Chairman showed remarkably fine specimens of Oxheart and Allhead cabbages grown from Central Bureau seeds. Mr. Newman tabled some splendid specimens of apples. He had grafted Nickajack apple upon a Stone Pippin stock, and the new fruit seemed to be different in color and markings to the Nickajack.

FOXES.—It was reported that foxes are again becoming very troublesome.

EXPERIENCE WITH HORSES.—Mr. E. Dutton read a paper on this subject. The following is the substance:—

As to the breaking-in of horses it is impossible to lay down any hard and fast rules, as horses are so different in temperament. Some being naturally docile it is hard to go wrong with them, and others are wild and naturally timid that it takes some time to gain their confidence. This applies generally, of course, to light horses, as well-bred draughts require little or no breaking-in. Unfortunately of late years light horses have been of such little value it

did not pay to take much trouble over them. The offspring of some mares are all easily broken in, and will not kick or buck under any ordinary conditions, and afterwards when spelled do not get girth proud. The progeny of some mares always buck round with the saddle if they have a few days' rest. Professor Train's plan was to get a hobble on his horse's front leg with the aid of a quiet horse to sneak behind, and then with a long strap like a surenigle over the horse's back fastened to this he quickly had the animal on three legs. After this it was easy to get him on his knees when he could neither kick nor do anything else much, and could be handled all over and everywhere without danger. It is essential to have a soft and sandy yard for this method. I have generally found ordinary hobbles sufficient for handling if the horses are wild, and anyhow I consider them excellent to teach a horse not to run round the yard when being caught. If they once learn to run around they are always hard to catch unless they are by themselves, and I think the main things are to make a horse a good leader and to be caught easily; if he leads well he is easy to break to harness. I have never seen a horse that leads well jib in harness. Another excellent dodge, and a very old one, is to drive the colt out in reins; it gets them used to traces. I have never seen a bolter after it. I have seen many ways of making a colt lead, but I prefer letting him follow another horse in the yard, leading the two in fact, or riding the quiet one now and again for a change. He learns this way very quickly, and there is nothing to frighten him and no whip. All the rest is a matter of time, and to break-in a horse well time must be taken for it under all methods I have seen. Although a colt may be quiet to ride bareback around the yard in a couple of hours he cannot be called broken-in, and the same business would have to be gone through next day. If I had a valuable horse to break-in I would not turn him loose out of the yard until broken-in, but feed him there and spend plenty of time with him daily, and in from ten days to a fortnight he would be properly broken-in, and would only require a little light and constant work to keep him so. I think one of the greatest advantages the public professors of horse-taming have is their closed in yards, and it would pay any one who is breaking-in a lot of horses to close his yard so the horse cannot see out. There is nothing else to take his attention, and he sees no possible chance of getting out, so always his eye is on his trainer, and hence he learns more quickly. Almost all of us who own horses get one now and again that has the most aggravating habit of not starting in harness after a spell, and perhaps some are confirmed jibs. These sort of horses you will have noticed are generally bad leaders—that is they will not lead with a slack rein, but generally require pulling. We will suppose we have a spring-cart horse who is a confirmed jib to deal with, perhaps quiet in other ways; it is worse than useless to touch with the whip a horse that will not start—he simply rears up and breaks something, or kicks the vehicle to pieces, especially a spirited animal. Put the harness on the horse and with 15 ft. of light rope (say  $\frac{1}{2}$  in. thick) make a running noose around his neck, and half hitch around his bottom jaw behind his bit teeth. Stand on his near side a few feet off (not in front) and give him the whole of your weight, and at the same time call him by name. He will come over like lightning; caress him, and if you do it about three times you will not be able to keep him away from you. Take him to your cart—possibly he will be restive—strap up his front leg and caress him, while your assistant puts him in the cart and takes the reins. As soon as ready let down his leg, having the rope coiled up, and directly you move and call him by name he will be most anxious to respond, being afraid of a repetition of the former treatment. Of course you never pull on him in the cart. I have never seen it required; it is holding back they want then. I consider this somewhat harsh treatment, and not of course suitable for a colt which does not know what is required of him, but I have never seen him fail, and I have seen it tried on old and stubborn subjects.

### Kadina, June 6.

Present—Messrs. T. M. Rendell (Chairman), Peter Roach, M. Quinn, S. Small, G. E. Putland, T. Jones, and J. W. Taylor (Hon. Sec.).

**FIELD TRIALS.**—Matters in connection with the forthcoming field trial of cultivating implements and show of live stock in connection with the Bureau Field Trial Society were dealt with.

**WIRE-STRAINER.**—The Hon. Sec. tabled wire-strainer made from forked branch of mallee, which worked in a satisfactory manner.

**SOUTH-EAST COUNTRY.**—Mr. Peter Roach read an interesting paper, giving his experience of a trip to the South-East. He was astonished to find what a small proportion of that district could be classed as first-class land, the bulk being good to fair pasture and rough country. He referred in eulogistic terms to the prospects of the Millicent district, and to the effect of the drainage works

undertaken by the Government, and contrasted the water trouble of the South-East with the water trouble in their own district. In the one they had to go to large expense to get rid of the water, and in the other they had none to get rid of. He thought, however, that much could be done with the water in the South-East that was drained away in the summer, and by utilising this water and tapping the underground supplies he considered the productive power of the land would be doubled within twenty-five years. There was room in the South-East for a large population, as by proper cultivation ten to twenty acres of much of the land would support a family. He referred to the various root crops grown, the possibilities of the dairying industry, and of utilising the water which is close to the surface for irrigation purposes in the summer. A number of questions concerning the treatment of various crops, and the management of sheep, dairy herds, and factories, were asked and answered.

### Holder, May 20.

Present—Messrs. F. A. Grant (Chairman), J. Rossiter, E. Trimming, P. J. Brougham, J. Maddocks, F. Rogers, F. Slater, E. Crocker, J. J. Odgers (Hon. Sec.), and one visitor.

**BINDER V. STRIPPER.**—A short discussion took place on the relative merits of these implements, members being fairly divided. Several considered the saving of grain and straw would not pay for extra expense for repairs and renewals, but others pointed out that this excessive wearing only occurred with machines used on sandy land. Members would like to have this matter discussed at Congress.

**EXPERIMENTS.**—Members reported that Profusion pea had proved very good, but Laxton's Evolution seemed a failure.

**IRRIGATION.**—Mr. Crocker initiated a discussion on "Does Irrigation Pay with a High Lift?" He maintained that it did, and quoted figures to show that in five years a person with 100 acres irrigated could regain his outlay by the produce of the orchard, and if dairying and pig-keeping, and the cultivation of potatoes, onions, &c., were combined with fruit-growing, he would have a substantial profit.

### Pine Forest, June 7.

Present—Messrs. J. St. J. Mudge (Chairman), D. F. Kennedy, G. Zilm, J. Muller, and R. Barr, jun. (Hon. Sec.).

**CONFERENCE.**—Matters in connection with the Conference of Northern Yorke's Peninsula Branches, held at Alford in March last were discussed, and great dissatisfaction was expressed at the fact that no report of the meetings had appeared in the *Journal of Agriculture and Industry*. The Hon. Secretary explained that a secretary to the Conference was appointed, and that gentleman took all the papers away, promising to make out the report and send it to the Central Bureau. This he had failed to do, although reminded of his promise on more than one occasion. A vote of censure was passed on the gentleman referred to for non-fulfilment of his duties as Conference Secretary.

**WOOD ASHES WITH SUPERPHOSPHATE.**—The Hon. Secretary reported that as Mr. Phillis had intimated his intention of mixing wood ashes with his super to make it run better through the drill, he wrote to the General Secretary for information as to whether it was advisable to do this. He had received a reply to the effect that bones and mineral matters containing phosphoric acid in combination with lime are crushed and treated with sulphuric acid, which combines

with a considerable quantity of the lime, forming sulphate of lime, and thus setting the phosphoric acid free to that extent, and making it far more readily available for the plants. Wood ashes contain over 33 per cent. of lime, so that by adding ashes to superphosphate the lime combines with the phosphoric acid and restores it to its original insoluble condition. Never mix lime or any substance containing lime or any alkaline matter with an acid fertiliser.

**HOMESTEAD MEETING.**—This meeting was held at the homestead of Mr. Muller, who has a block of twenty acres. The whole of this was being put to good use, indeed the members thought to too much use, as vegetables were being grown right up to the stems of the fruit trees and vines. Members thought this practice would in the long run prove detrimental to the trees. Peas, cabbages, and other culinary vegetables were well grown and fit for use, and the owner was complimented on his success as a "blocker." After the meeting the members and their families were entertained by Mr. and Mrs. Muller.

### **Kapunda, June 3.**

**Present**—Messrs G. Teagle (Chairman), W. Flavel, H. King, Patrick Kerin, G. Harris, J. H. Pascoe, and J. J. O'Sullivan.

**SPARROWS.**—A long discussion took place on the sparrow nuisance. United action was recommended during the next two months by the district councils and land owners. Mr. King recommended soaking wheat in solution of sugar and carbonate of soda and distributing this for four or five days previous to giving them poisoned wheat. He believed more satisfactory results would be obtained if this were done.

### **Murray Bridge, June 11.**

**Present**—Messrs. F. H. Wurm (Chairman), W. Lehmann, J. J. Stocker, W. Schubert, J. G. Jaensch, B. Jaensch, H. Block, J. Cowan, J. G. Newmann, W. F. Wundersitz, and R. Edwards (Hon. Sec.).

**ENSILAGE.**—Mr. W. G. Hannaford exhibited a sample of pit ensilage made five years ago. It had proved of considerable value to him during the past summer and at the commencement of the present winter for his stock. Mr. T. Heinrich supplied a number of plants of kale for distribution.

**SINGLE V. MARRIED FARMERS.**—Papers were read by Messrs. W. Lehman and W. F. Wundersitz on the advantages and disadvantages of married life for farmers. [These papers being highly controversial, and not exactly relating to practical agronomy, I do not propose to devote space to their publication.—GEN. SEC.]

### **Riverton, June 11.**

**Present**—Messrs. H. A. Davis (Chairman), J. Kelly, M. J. Andrews, H. B. Welch, T. Gravestock, C. C. Castine, Dr. Allwork, and H. A. Hussey (Hon. Sec.).

**GOVERNMENT BULLS.**—The Hon. Sec. was instructed to inquire when the Jersey bulls purchased by the Government last year would be shifted from their present localities. [Owing to the bulls being only yearlings when purchased it was necessary to limit their use, and as the various Branches have been responsible for their feeding and care for eight months for very little return, the Minister of Agriculture has decided that they shall remain as at present for another six months.—GEN. SEC.]

**LEMON-CURING.**—Dr. Allwork read the following paper on this subject :—

Like other growers of lemons, I have in the season of plenty wished to adopt some simple, economical, and effective means for the preservation of the fruit so that I could have them at seasons when they were not so plentiful. I was fortunate enough to see somewhere an account of a plan adopted in some parts of Italy, where it was stated that they dug a square hole in the ground about 10ft. deep, put in a layer of dry sand, and a light shed over all. I determined to adopt a modification of this plan, and the fruit I now exhibit is, I think, sufficient proof of its efficacy. Those lemons were cut on October 27, 1897, and are a fair sample of 120 which I put down then, and although I have used nearly 100 of them at date, have only found some half-dozen unfit for use. I selected and put into my cellar—a good dry one—a square zinc-lined case of suitable size, into the bottom of which I placed 4in. of dry sand; on top of that another square case (wood), smaller, and leaving a space of 4in. all round, which I filled with sand. In the bottom of the inner case a layer of about 3in. of sand, then a layer of lemons wrapped in “cap” paper with a space of about 1in. between each, then 3in. of sand and more lemons, and so on, finishing off with a thicker layer of sand. I believe, however, a very important point is the handling of the fruit. This was done most carefully, each one being held by the left hand in the piece of paper of suitable size in which it was to be wrapped, the stem was then cut by a sharp pair of strong scissors, the fruit carefully rolled up in the paper and placed in a basket with soft packing at the bottom and only one layer of fruit, then taken to the cellar. Any of the lemons showing moisture through the wrappers from the oil of the skin were rejected. I consider the result more favorable than I could have expected, as, owing to unavoidable circumstances, the fruit was cut during very hot weather, and many of them were undoubtedly ripe than they should have been.

Dr. Allwork tabled samples of lemons picked eight months previously and cured in the manner described. They were in splendid condition, and of good flavor.

### Amyton, June 2.

Present—Messrs. John Gray (Chairman), A. Gray, W. Gum, Thomas Gum, W. Hawke, H. B. Turner, and S. Thomas (Hon. Sec.).

**CONSERVATION OF FODDER.**—Mr. Hawke read a short paper on “Conservation of Fodder, or Providing for Seasons of Drought,” to the following effect :—

Save all wheat (cocky) chaff. In good seasons thousands of tons are burnt. It should be carted into heaps of, say, 2,000 bags, covered with a thick layer of straw to keep out the wet, and fence it securely. If carefully covered it will keep good for years. Do not put all in one heap on account of risk of loss by fire.

It is advisable to save all the straw possible. Either cut the crop with binder and thrash it or follow up the reaper with the binder before the straw is knocked about by stock. It will pay well to keep the harvest hands on for a week or two longer to do this, as wheat chaff or chaffed straw with molasses, copra meal, bran, or pollard makes good food for stock. Fence the stacks securely: what is worth stacking is worth protecting.

Manure low-lying patches of soil to encourage rank growth, and in wet seasons cut it for ensilage. In good seasons cut the geranium and other natural herbage for ensilage. The wells are mostly situated in hollows; plant, say, an acre or two with lucern, and irrigate it by turning the flood waters on to the patch. In time of drought use the water from the well if it is suitable. This will keep at least one cow in feed. Low-lying patches could be similarly irrigated, and crops of holcus, Kaffir corn, sunflowers, &c., grown either for green feed or for ensilage.

Sow a small paddock, say ten to twenty acres, with the best saltbushes, also use rough hilly country for same purpose. If this were done, perhaps a little at a time, the saltbush would prove of immense value in dry seasons.

In reply to question, Mr. Hawke said he would put a layer of chaff 10ft. thick over the heaps of wheat chaff. Mr. W. Gum said 5ft. would be thick enough if laid on well. Straw being of value, no more than is necessary should be used, as it gets spoilt in removing the chaff. The Hon. Secretary said the best plan would be to erect a series of forks and rails, similar to illustration in December issue (page 432) of the *Journal of Agriculture and Industry*, but with slanting forks on both sides and at each end, to support the straw. The

chaff could be packed underneath, and taken out as required by removing the straw from one end. Members agreed that the binder should follow the stripper to remove the straw before it is trodden about by stock. Mr. Gray advised cutting wild oats before they seed, and making them into ensilage. Chaffing them first was not necessary.

### Holder, June 11.

Present—Messrs. F. A. Grant (Chairman), J. Rossiter, F. Slater, F. Rogers, E. Crocker, J. Maddocks, P. J. Brougham, and J. J. Odgers (Hon. Sec.).

**CABBAGE PEST.**—Two members tabled specimens of cabbages attacked by small caterpillars, the leaves being riddled. One member suggested dusting the plants with soot, while lime was mentioned as a remedy. Mr. Slater said that the whole of his crop had been destroyed by this pest. [Boil 5galls. water with 1lb. washing soda; add 1lb. gas tar drop by drop, stirring vigorously all the time; then add 70galls. to 90galls. water, and thoroughly spray the cabbages, &c. This will effectually banish the caterpillars.—GEN. SEC.]

### Strathalbyn, June 13.

Present—Mr. M. Rankine (Chairman), Hon. J. L. Stirling, Messrs. George Sissons, L. Dunn, E. R. Morgan, W. M. Rankine, R. Watt, and J. Cheriton (Hon. Sec.).

**FERTILISERS.**—Considerable discussion took place on paper read by Mr. W. M. Rankine on "Chemical Fertilisers," read at previous meeting, most of the members agreeing with the writer.

**HINTS FOR THE FARM.**—Mr. Sissons read a paper on this subject, as follows:—

**Horses.**—For a farmer to be successful he must take great care of his horses. We make mistakes sometimes by leaving the horses in the paddocks till we want to work them. I find it necessary to feed them for at least a month before commencing ploughing for several reasons. When running in the paddock they pick up sand and all kinds of rubbish, and become weak. Begin to work them in this state they get overheated, and the result is they get sore shoulders. If possible, after a spell, horses should be worked for a few hours only each day for two or three days until their shoulders harden. It is best to work colts for about two days, and then let them spell for the next two or three until their scalds dry up; doing this they very seldom get sore shoulders. When working, horses should have good stabling or a good dry shed. If the stable is not waterproof and lets the water drip through, it does them much harm, and is apt to give them a chill, which will probably culminate in stoppage and inflammation, and unless treated skilfully result fatally. It will pay every farmer to keep his horses well housed while at work. All horses when brought in from the paddock should be given an aperient once or twice before starting work. I find the following to be beneficial:—(One teaspoonful of aloes, one ditto resin, one ditto Gentian root, and as much Venice turpentine as will mix same into a ball. If for a stoppage mix three teaspoonfuls of aloes with boiling water; when well mixed add a little turpentine and give as a drench.

**Cows.**—The problem is how to make them pay the best. This is an industry that has been carried on extensively for many years in the south with fair success. At this season of the year Cape oats or barley for green feed, with a little hay to prevent scouring, is the best for producing milk and keeping the cows in condition. I have tried sowing for green feed after the first rains in March, but I find the most successful way is to work the land well and plough the seed in in the dry weather, as it will then stand the drought better. For summer feed I have tried millet, horse-tooth maize, red clover, Cow pea, Jersey kale, and mangolds. For producing milk and butter mangolds are better than any of the others, with Jersey kale next. The Cow pea is a splendid thing, the cattle being very fond of it, but I cannot grow enough to the acre to make it pay. The cow, like the horse, requires good shelter during the winter months.

*The Pig* is no small item when combined with the dairying industry. The question is which is the most profitable kind to breed. For bacon the Berkshire is the best, but they must be kept shut up and fed well; but for the general run of farmers who let their store pigs run out, and to a great extent pick up their own living, I think the Essex best, as they are a great deal easier made marketable, while, as for the Berkshire, the more he is fed the more he grows, and until he has attained a good age it is almost impossible to fatten him. To be successful it is best to breed from Essex boar and a Berkshire sow, but on no account have more than the one cross. To fatten these pigs I grow peas, and find there is nothing better for the purpose. The peas also have other uses besides fattening pigs; they clean the land and act as a fertiliser. The most successful way to grow them is to carefully prepare the land and then to plough them in about 3in deep. Do not plough in deeper, for if the land is very wet half the seed will rot. Sow bonedust on the top of the ploughing and then harrow it in.

### Swan Reach, June 1.

Present—Messrs. P. A. Hasse (Chairman), J. O. J. Kohnke, A. G. Zadow, J. L. Baker, F. Fischer, A. Fischer, F. F. Brecht, G. Greiger, R. J. Harris, P. A. Beck (Hon. Sec.), and a number of visitors.

CO-OPERATION.—At the invitation of the members Mr. A. Wight attended, and gave an address on the working and benefit of the South Australian Farmers Co-operative Union.

### Bowhill, June 2.

Present—Messrs. A. Dohnt (in chair), C. Drogemuller, E. Weyland, J. Waters, J. Whitehead, H. H. Plummer (Hon. Sec.), and one visitor.

PROFITABLE FARMING.—Mr. Weyland read a short paper on "How can we make Farming Pay with Wheat as low as 1s. 6d. to 1s. 9d. per bushel." He considered it could only be done by mixed farming. Other grains than wheat should be grown, and it should be converted on the farm into a saleable product, *i.e.*, for feeding to pigs and poultry. Fowls, turkeys, ducks, &c., both table and laying breeds, should be kept. A good quantity of hay should be cut and fed to cows, principally with a view to butter-production, but also for beef. Each farmer should get a chaffcutter and a corncrusher, so as to be able to give his stock a change of food. Changing from soaked or boiled corn to crushed, and *vice versa*, is very beneficial at times. Then the farmer should keep a few breeding mares of the right sort, so as to be able to dispose of one or two good young horses each year. Every farmer should keep sheep, not only for meat for his own use, and wool and sheep for sale, but also to help clean the land. Mr. Dragomuller considered that whenever wheat reached 1s. 6d. per bushel it would pay them better to use as much as possible in feeding pigs, poultry, &c., for sale. Mr. Dohnt advocated raising porkers of from 60lbs. to 80lbs. weight for export, or for sale in the Adelaide market. The Hon. Secretary thought the man that failed to keep pigs, poultry, and other stock on his farm was not a farmer, but simply a graingrower. General farmers were scarce in the Murray districts.

### Richman's Creek, June 6.

Present—Messrs. W. Freeman (Chairman), J. J. Searle, A. Knauerhase, J. McSkimming, M. Hender, P. J. O'Donohue, W. J. Wright, A. Nicholson, J. McColl (Hon. Sec.), and one visitor.

BUNT.—Mr. Searle showed what appeared to be wheat plants growing in a box, and stated that nothing but bunt balls had been sown there. Members carefully examined the plants, and, upon removing them from the soil, found the

seed at the roots with in some cases a milky substance at the germ end, and in others nothing but the shell of the seed. Several members stated that they had sown bunt balls in prepared seed beds, but failed to get any growth. A conversational discussion ensued on the possibility of bunt balls producing plants, and the Hon. Secretary suggested as an explanation that there was some substance left at the germ end of the bunt ball which grew. Some years ago he had noticed grains consisting of bunt at one end and solid matter the other, and had often noticed cars containing bunt balls one side and sound grains the other.

### Mount Gambier, June 11.

Present—Messrs. J. Umpherston (Chairman), J. Watson, J. Bowd, T. H. Williams, W. Barrows, W. Mitchell, G. G. Collins, and E. Lewis (Hon. Sec.).

**DAIRYING.**—Mr. Watson stated that the Dairy Instructor had visited the district recently and inspected most of the factories. He expressed his satisfaction at the possibilities of the dairying industry in this district, and promised to make another visit later on, when he would lecture on dairying and give practical demonstrations in butter and cheese making.

**CODLIN MOTH.**—In reply to questions, Mr. Williams said good work was done last season in the destruction of codlin moth by bandaging the trees and gathering infested fruit. Where hedges, &c., afforded protection to the caterpillar the pest has been as bad as ever, but he strongly believed that, provided the gardens were kept clean of everything likely to afford shelter to the caterpillars, bandaging alone would keep the pest in check. He had about sixty apple trees in his garden, and the bandages were examined once a week. For the first few weeks he had got as many as 700 caterpillars at each examination, but this number gradually lessened until they only found a few each time. Mr. Watson said the early broods showed no lessening of numbers from bandaging operations, but there was no doubt that the later broods were greatly lessened, as every caterpillar destroyed meant perhaps fifty less in the following brood. He noticed the Inspector of Fruit found arsenite of lime much cheaper and just as effective as Paris green. Mr. Williams said an inspector should be appointed for the South-East. With his other duties, it was impossible for him to carry out the work as it should be done in the breeding season.

**TUBERCULOSIS.**—Mr. Mitchell read an article from the *Australasian* deprecating the sensational statements in regard to this disease, pointing out that, as far as the milk was concerned, the tubercle bacillus had never been found in milk unless the udder was attacked by the disease. Mr. Williams said scientists had proved that the bacilli were in milk taken from a tuberculous cow where the udder had not been attacked. Experiments had been made where animals fed on the milk of such a cow had died from the disease. It would be simply madness to use the milk from a tuberculous cow, and it would be criminal to send it to a factory. An instance of the danger had come under his notice some time ago. He had occasion to kill a tuberculous cow, and he thoroughly examined her udder, but could find no trace of the bacilli. He was sorry to say that two members of that family had since died from tuberculosis. He thought this was very clear proof, and he felt justified in mentioning the case. Mr. Watson did not think it would be wise to give people the idea that they could use or sell milk obtained from tuberculous cows without risk to health. Mr. Williams said that tuberculosis was getting more rare, but he thought they should do all they could to warn people that they must not keep any beast which showed the slightest sign of the disease. In reply to a question, he said



he did not think the disease was going to take a hold of the rabbits. What had been mistaken in rabbits for tuberculosis was not the disease. He had examined a good many rabbit livers, but could find tuberculosis in none of them.

**SLUGS AND SNAILS.**—Mr. Mitchell said he had noticed it stated that hedges and shrubs in which these pests harbored should be sprayed with a 4 per cent. solution of copper sulphate in the morning or evening. Lime should be added to prevent injury to the foliage. Equal parts of sulphate of copper and carbonate of soda dissolved in water and sprayed on the plants was also effective in getting rid of slugs and snails. Mr. Bowd said he had got rid of snails by use of salt and lime, while the Chairman said he failed to extirpate them with salt.

### **Tatiara, June 4.**

Present—Messrs. G. Ferguson (Chairman), F. Smith, R. Scown, W. Montague, H. Killmier, Thos. Stanton, and W. E. Fisher (Hon. Sec.).

**FRUIT PESTS.**—Attention was called to the fact that apples had, during the past season, been brought into the district from codlin moth infested orchards, and that grapes had been introduced from Victoria. It was decided to bring the matter under the notice of the Central Bureau, and urge that all fruit should be inspected at the Bordertown Railway Station before being removed, and also that the importation of grapes from Victoria should be stopped, owing to danger of introducing phylloxera. [The introduction of grapes, or any portion of a grape vine, from any part is absolutely prohibited, and any person bringing any grapes or vines into the colony renders himself liable to a penalty of £50; and in view of the imminent danger of introducing the phylloxera, it is the duty of everyone who has knowledge of the infringement of the law in this respect to at once report it to the authorities. In regard to the inspection of fruit at the railway stations, it is a matter of impossibility for the Government to appoint a paid inspector in each district to do this work, however necessary such inspection may be, and it rests with the fruitgrowers to protect their own interests by getting one or more of their number to act as inspectors, and, if necessary, contribute to a fund to pay him for loss of time. If such inspector were appointed by the Government, he would have full power to inspect all fruit brought into the district, and destroy any found infested.—GEN. SEC.]

### **Maitland, June 4.**

Present—Messrs. C. F. G. Heinrich (Chairman), Thos. Bowman, W. Wilson, A. Jarrett, J. S. McLeod, H. Wundersitz, O. Treasure, J. Pitcher, J. Hill, J. W. Shannon, J. Kelly, J. Smith, and C. W. Wood (Hon. Sec.).

**ALGERIAN AND CAPE OATS.**—Mr. Shannon tabled two samples of oats, to see whether the members could decide which were Cape oats and which Algerian. These oats are often sold in the district one for the other, causing much loss and disappointment. Members could not agree which was which, and it was decided to sow the seed and note results. Mr. Shannon said both samples were sold as Cape oats.

**MANURES.**—Members were agreed that fruit trees and vines were much benefited by a light dressing of farmyard manure. Mr. Shannon said he noticed one of the Adelaide daily papers gave the whole of the credit for the introduction of the seed and fertiliser drills in this colony to the wrong person. He considered the present system of putting in the seed with a comparatively small amount of manure—80lbs. to 112lbs. per acre—originated with certain farmers in the Minlaton district.

**Mount Compass, June 14.**

Present—Messrs. J. Youlton (Chairman), W. Wright, S. Arthur, W. Gowling, R. Peters, M. Jacobs, F. Slater, H. McKinlay (Hon. Sec.), and four visitors.

**ANNUAL REPORT.**—The Hon Secretary's annual report showed that during the twelve months twelve meetings were held, with an average attendance of nine members. All the members have felt the benefit of the work of the Branch, and nearly all the vegetables received from the Bureau have proved valuable additions to their present collections. During the year four papers were read and discussed.

**Dawson, May 28.**

Present—Messrs. R. Renton (Chairman), J. Collins, C. W. Dowden, C. F. W. Just, A. J. Hooper, C. H. Meyers, O. Muller, A. H. Warner, Thos. Weatherill, and two visitors.

**FRUIT-GROWING IN THE NORTH.**—Mr. Muller read a short paper giving his experience of growing fruit in this district. When he first took up land in this district he selected a spot on a watercourse for his garden. He first planted some Brandis almonds, which did so well that each year he extended his garden, until he had in 1888 nearly 150 almond and 200 other fruit trees, besides smaller fruits, from nearly all of which he had gathered at least one crop. In 1889, however, floods washed nearly everything away, only one almond tree being left standing, and a few fruit trees left flat on the ground. These were raised and supported, and have since recovered. His efforts to repair damages have not, owing to ravages of rabbits and drought, been a great success; but he still thought every farmer should grow some fruit. Select soil in or near a watercourse, so that the trees may be flooded with every light rain if needed, plant about 20ft. to 30ft. apart, and work the land well. Do not manure the trees when planted, but water frequently until they are established. For this district he found the following varieties do well:—Plums, Pond's Seedling and Rivers; apricots, Moorpark and Hemskirke; peaches, Royal George and Mechany; nectarines, Elruge and Lord Napier; quinces, Portugal; figs, Common Turkey and Brunswick Green; apples, Cellini; pear, Duchess. Considerable discussion followed. Mr. Meyers did not consider it advisable to have the orchard far from the house, as parrots, sparrows, and other pests would have all the fruit if not looked after. He advised deep ploughing in preference to digging holes in which to plant the trees, and would put the trees 18ft. apart. He believed the best time to prune was as soon as the fruit is off. [This practice is not adopted by any grower for market. They wait till the leaves are off the trees.—GEN. SEC.]

**Stockport, June 21.**

Present—Messrs. F. Watts (Chairman), C. W. Smith, D. G. Stribling, S. Smith, J. Smith, J. Smith, jun., T. Megaw, G. Burdon, and J. Murray (Hon. Sec.).

**"SOURSOPS."**—Mr. C. W. Smith initiated discussion on best means of destroying "soursops" (*Oxalis cernua*). He wished to know whether there was any fertiliser that could be put in with the wheat to force it so that it would choke this weed, or whether any chemical could be used for destroying the weeds. Members were agreed that it was next to impossible to destroy this weed. [Try the treatment mentioned on page 906 of June issue of the *Journal of Agriculture and Industry*.—GEN. SEC.]

**ANNUAL REPORT.**—The Hon. Secretary read his sixth annual report, showing that during the past year twelve meetings were held, with an average attendance of over ten members. Two papers were read and discussed, and other matters of importance dealt with. He appealed to the members to attend more regularly, and to take part in the meetings by contributing papers or initiating discussions. Messrs T. Megaw and G. Burdon were elected Chairman and Vice-chairman respectively, and Mr. J. Murray re-elected Hon. Sec. for ensuing year.

### Angaston, June 18.

Present—Messrs. R. Player (Chairman), M. Andrew, A. Friend, J. E. Swann, P. Radford, A. Sibley, A. Salter, E. Thamm, J. Vaughan, W. Sibley, S. O. Smith, and F. Thorn.

**APPLES FOR EXPORT.**—Mr. Salter stated that he had netted 7s. per case from the apples he had sent to London this year.

**ZANTE CURRANTS.**—Mr. Smith said there was an error in report of Kapunda Conference in the May *Journal* in regard to yield from seven-year-old Zante currants. It should have been stated that 3 tons of currants were obtained from fourteen acres.

**DRIED FRUITS.**—Mr. Swan read an interesting paper on this subject, which he offered to read at the forthcoming Congress in Adelaide.

### Balaklava, June 18.

Present—Messrs W. H. Sires (Chairman), P. Anderson, E. Roberts, J. Vivian, C. H. Reid, J. Willmott, G. Reid, J. Mills, W. H. Thompson, E. M. Sage (Hon. Sec.), and one visitor.

**OFFICERS.**—Mr. W. H. Sires was elected Chairman and Mr. E. M. Sage re-elected Hon. Sec. for ensuing year.

**FODDER PLANTS.**—Mr. Sage tabled sample of Broadleaf mustard, ten weeks' growth without irrigation. Members expressed surprise at the rapid growth the plant had made. Mr. Reid said his red and white Kaffir corn failed to mature seed, except where watered. After cutting off the seed he gave the stems to the cattle, the whole being consumed with relish though hard and dry. Other members reported failure with seeds owing to dry weather.

**PRUNING.**—Mr. Sage spoke on the pruning of fruit trees, illustrating his remarks by aid of limbs cut from some of his trees.

### Onetree Hill, June 8.

Present—Messrs. F. Bowman (Chairman), G. Bowman, H. H. Blackham, W. Kelly, E. A. Kelly, J. Hogarth, J. Flower, A. Thomas, A. Adams, J. Clucas (Hon. Sec.), and one visitor.

**EXHIBITS.**—Mr. Kelly tabled several kinds of vegetables, including a very large pumpkin weighing 56lbs.

**POISONING.**—Mr. Adams said he had a cow which suffered badly from this complaint shortly after calving. He gave her a dose of strong brine to promote thirst, and also ten drops of aconite; hot fomentations were applied to the loins, and the cow was now well. Members were disposed to doubt

whether this was really redwater. The Chairman had frequently noticed newly-calved cows similarly affected, but with a little care they come round all right. There was a danger of purging cows too freely. Mr. G. Bowman recommended a bran mash with brown sugar for cows newly come in. A visitor said he found half an ounce of Epsom salts in a pound of treacle good treatment for redwater.

**WHEAT-GROWING.**—Mr. Adams read a paper on "Wheat-growing since 1851," to the following effect:—

Having been connected with wheat-growing in the district since 1851, I have seen a great many changes in the varieties of wheat and the management of the land. The wheats usually sown were Red Straw, Club Head, and Brodies. The latter has gone out of existence. Many years ago the Club Head was a prolific bearer, and I have seen as much as 27 bush. per acre from it, but that seems also to have gone out of use, as it was rather chaffy and a small grain. The Red Straw was a grand old wheat, but rather subject to shake out. Then Goldsmith's was very extensively grown, and produced some wonderful yields, but it was also very liable to shake out and to red rust. Red rust began to make its appearance about 1860 or 1861 in patches. About 1863 Purple Straw began to be used and ever since it has been the most profitable wheat grown. In that disastrous year, 1867, it withstood the effects of the red rust better than any other kind. Talavera was very badly affected, it being a very soft straw. Previous to the rusty year the crops used to be very much thinned out with black rust, but since then there has not been so much. I have found Purple Straw the most profitable to grow, both for hay and milling purposes. I have not had much experience of the newly-introduced wheats, but think that Tuscan, Purple Straw, and the bearded varieties are the best for dry seasons. With the improved methods of drilling and fertilising manures there is no doubt that farming will receive a great impetus. Everyone admits that fallowing is the best, although I do not see why newly-ploughed land or stubble should not be as good with the use of the drill and manures afterwards, being well rolled down with a heavy roller. My impression is that land is not so thoroughly worn out as some would lead us to believe. The great cause of failure is more the want of sufficient moisture in the soil to bring the nutritive properties to act more on the plant."

In the discussion which followed the effect of black rust was described. Mr. Flower stated that the rust was more prevalent on the plains than in the hills. Purple Straw, though the color was against it for marketable purposes as hay, was commended by members as being as good an all-round wheat as could be grown. White Tuscan, too, was favorably spoken of. Fallowing and its results under various conditions engaged members in an interesting discussion, and the subject, in conjunction with manuring and the use of the drill, with comparative results in wet and dry seasons, had evidently induced close observation. In a dry season land that had been fallowed would yield better than manured land without fallow. Mr. Flower said fallowing should be done, if possible, after the ground had been thoroughly soaked. The advantages of the use of the drill and fallowing were generally attested.

### Port Lincoln, June 17.

Present—Messrs. S. Valentine (Chairman), R. Puckridge, W. E. Goode, E. Chapman, J. D. Bruce, W. Laidlaw, and J. Anderson (Hon. Sec.).

**STANDARD WEIGHT FOR CHAFF.**—Mr. Laidlaw introduced the question of a uniform weight for bagged chaff, and thought 40lbs. per bag should be fixed. Mr. Goode agreed and thought such action would help to ensure only fair quality chaff being sold, as much inferior chaff would not go the weight. The Hon. Secretary thought fixing standard by law would prove very inconvenient; many farmers use steelyards, which are seldom reliable to a pound or two. A standard would also prevent them from using their old bran bags for chaff. The better way would be to put chaff on the scales and sell by actual weight. It was resolved that this Branch is in favor of fixing the standard weight of chaff at 40lbs. per bag.

**CROSS-BRED MERINO SHEEP FOR MUTTON.**—Mr. Puckridge read the following paper on this subject:—

Are our farmers who combine farming and grazing correct in breeding only Merino sheep? Taking our west coast country, which is generally coastal, I should say "Yes," but the north coast district is admirably suited in many places for breeding cross-breeds, and many of our farmers there might, with profit to themselves and benefit to the district, breed this kind of sheep, as during the months of April, May, June, and July, as far as butchers' meat is concerned, we practically suffer from famine; whereas, if some of our farmers would turn their attention to breeding cross-breeds, this would not be the case. The most suitable breeds for our district would be the Shropshire or the Southdown, both good doers, but I should give the preference to the Shropshire, as it has the faculty of holding its condition longer than any other breed and is better suited for small holdings, being very quiet, and not inclined to travel. As mutton sheep the difference between the Merino and the Shropshire is very great. I have seen them running in the same paddock and every Merino poor, while every Shropshire was fat and good value in any market. The cross between the Shropshire and Merino is a very good doing sheep; also the Southdown cross, but, like the Merino, they are more restless. To cross the Merino with either of these, breed from aged but sound Merino ewes. I am certain if some of our enterprising farmers on our north coast would introduce either of these breeds and take care not to overstock they would find they could not only supply the local markets, but would have stock that would pay them handsomely to export. The crosses are much more prolific than the Merino, often producing 120 lambs to the 100 ewes, and have thick compact fleeces. The Shropshire is about a third heavier than the Southdown, but both are good mutton sheep; this we are sadly in need of, and either of these would be worth from 10s. to 17s. per head and would pay butchers better to buy at that price than the Merino at 5s. per head.

Mr. Bruce favored the Merino for the country referred to; he believed the grass too poor for larger framed sheep. Mr. Goode was not favorably disposed towards the cross-breeds; they had been tried more than once in the district and failed. The Hon. Secretary thought the Merino was admittedly the best for large flocks where wool was the one thing aimed at, but agreed with Mr. Puckridge that for small farmers, and for ration purposes the large-framed breeds would be more profitable. The Chairman agreed, but was doubtful whether with their small markets it would pay to breed sheep for the butcher. Mr. Puckridge replied, and claimed that with the prices ruling in Adelaide it would pay well to ship both fat lambs and sheep to the market there.

### Carrieton, June 23.

Present—Messrs. W. J. Gleeson (Chairman), M. Manning, R. Fuller, M. Travers, H. Menz, G. Martin. J. W. Bock (Hon. Sec.), and one visitor.

**SEEDING.**—Considerable discussion took place on thick *versus* thin sowing of wheat. Members generally favored sowing according to size of grain; with small grain say  $\frac{1}{2}$  bush. per acre, and with large plump grain up to 1 bush.

**EXPERIMENTS.**—Mr. Kaerger reported as follows on experiments with Bureau seeds:—Kaffir corn and Pop corn, not irrigated, grew well, but did not seed. He had seen Kaffir corn in several places this past season, and, though making good leaf, no seed was formed. It was stated that this was only another name for Dhurra. [Not quite correct. Kaffir corn is a new and improved variety of the common Dhurra.—GEN. SEC.] Burpee's Lima and Saddleback bush beans failed; cow pea and Lazy Wife pole bean, irrigated, fairly good; McIvor and Black Spanish water-melons did well, but sweet-melons failed; Golden marrow, pumpkin, and Mammoth White Bush Squash did well, one plant of the latter producing 90lbs. of fruit; Fordhook White Spine cucumber, good; Champion and Golden Drop tomatoes, very prolific and splendid flavor.

**FOWL TICK.**—Mr. Fuller reported having lost a number of fowls from tick. He had never seen them so bad. The birds had been dipped in strong tobacco-water, but it did no good. He would like to know what to do to get rid of the pest. [Burn the old fowlhouse, which is full of ticks in every cranny. Take each fowl and rub under the wings and thighs, where bare of feathers, with a sponge or flannel damped with pure kerosene. Build a new fowlhouse away from the old one, using galvanized iron, fixed *inside* the framework. Have the perches swung by wires, free from the walls, and with guy-wires to prevent swaying. Wrap piece of wool or piece of flannel around each wire, and damp occasionally with kerosene to prevent ticks climbing down to the fowls at night. GEN. SEC.]

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### Clarendon, June 17.

**Present**—Messrs. A. Harper (Chairman), J. Wright, D. Thompson, R. Hilton, W. Spencer, H. Payne, D. Bilney, J. Spencer, J. Piggott, J. Juers, W. A. Morphett, and A. L. Morphett (Hon. Sec.).

**FARMING.**—Mr. Spencer read an interesting paper on this subject, which was well discussed. Mr. Bilney stated that from one grain of White Tuscan wheat sown he harvested 500 grains.

**PEAS.**—Mr. Bilney tabled samples of pea of very prolific nature, each plant producing seven or eight stems, which grow about 4ft. long. To be sent to Central Bureau for identification. [I regret I do not know this pea, and must confess my inability to identify the varieties of peas from their seeds alone.—GEN. SEC.]









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